# Department of Defense
# Fiscal Year (FY) 2020 Budget Estimates

March 2019

## Navy

*Justification Book Volume 3 of 5*

## *Research, Development, Test & Evaluation, Navy*

## Budget Activity 5

The estimated cost of this report for the Department of the Navy (DON) is $132,280.

The estimated total cost for supporting the DON budget justification material is approximately $1,803,116 for the 2019 fiscal year. This includes $81,351 in supplies and $1,721,765 in labor.

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# Department of Defense Appropriations Act, 2020

## Research, Development, Test and Evaluation, Navy

For expenses necessary for basic and applied scientific research, development, test and evaluation, including maintenance, rehabilitation, lease, and operation of facilities and equipment, $20,434,909,000 to remain available for obligation until September 30, 2021.

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FY 2020 Overseas Contingency Operations funding can be separated into the following categories:

OCO for Direct War Costs ($37,000,000): OCO for Direct War costs are those combat or direct combat support costs that will not continue to be expended once combat operations end at major contingency locations.

OCO for Enduring Requirements ($127,410,000): OCO for Enduring Requirements are enduring in-theater and in-CONUS costs that will likely remain after combat operations cease, and have previously been funded in OCO.

OCO for Base Requirements ($0): OCO for Base Requirements is OCO funding for base budget requirements in support of the National Defense Strategy. The Budget requests these funds in OCO to comply with the base budget defense caps included in the Budget Control Act of 2011.

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Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

| Appropriation | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|---|---|---|---|---|
| Research, Development, Test & Eval, Navy | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 |
| Total Research, Development, Test & Evaluation | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 |

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

| Appropriation | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|---|---|---|---|---|---|
| Research, Development, Test & Eval, Navy | 20,270,499 | | 164,410 | 164,410 | 20,434,909 |
| Total Research, Development, Test & Evaluation | 20,270,499 | | 164,410 | 164,410 | 20,434,909 |

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

| Summary Recap of Budget Activities | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|---|---|---|---|---|
| Basic Research | 604,634 | 679,772 | | 679,772 |
| Applied Research | 975,419 | 1,018,795 | | 1,018,795 |
| Advanced Technology Development | 900,071 | 851,710 | | 851,710 |
| Advanced Component Development & Prototypes | 4,210,640 | 4,139,479 | 33,300 | 4,172,779 |
| System Development & Demonstration | 6,037,909 | 5,863,466 | 1,100 | 5,864,566 |
| Management Support | 1,388,936 | 1,023,070 | | 1,023,070 |
| Operational Systems Development | 4,347,723 | 4,913,710 | 133,412 | 5,047,122 |
| Total Research, Development, Test & Evaluation | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 |
| **Summary Recap of FYDP Programs** | | | | |
| Strategic Forces | 192,820 | 240,310 | | 240,310 |
| General Purpose Forces | 1,514,837 | 1,914,231 | 16,130 | 1,930,361 |
| Intelligence and Communications | 816,404 | 608,772 | | 608,772 |
| Research and Development | 13,991,927 | 13,937,905 | 34,400 | 13,972,305 |
| Central Supply and Maintenance | 40,084 | 73,844 | | 73,844 |
| Administration and Associated Activities | 1,820 | 1,579 | | 1,579 |
| Space | 49,738 | 42,858 | | 42,858 |
| Classified Programs | 1,857,702 | 1,670,503 | 117,282 | 1,787,785 |
| Total Research, Development, Test & Evaluation | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 |

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

| Summary Recap of Budget Activities | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|---|---|---|---|---|---|
| Basic Research | 605,978 | | | | 605,978 |
| Applied Research | 936,453 | | | | 936,453 |
| Advanced Technology Development | 742,210 | | | | 742,210 |
| Advanced Component Development & Prototypes | 5,559,062 | | 40,006 | 40,006 | 5,599,068 |
| System Development & Demonstration | 6,332,033 | | 1,122 | 1,122 | 6,333,155 |
| Management Support | 990,464 | | | | 990,464 |
| Operational Systems Development | 5,104,299 | | 123,282 | 123,282 | 5,227,581 |
| Total Research, Development, Test & Evaluation | 20,270,499 | | 164,410 | 164,410 | 20,434,909 |
| **Summary Recap of FYDP Programs** | | | | | |
| Strategic Forces | 239,019 | | | | 239,019 |
| General Purpose Forces | 1,835,959 | | 15,000 | 15,000 | 1,850,959 |
| Intelligence and Communications | 692,089 | | | | 692,089 |
| Research and Development | 15,828,006 | | 41,128 | 41,128 | 15,869,134 |
| Central Supply and Maintenance | 44,961 | | | | 44,961 |
| Administration and Associated Activities | 1,460 | | | | 1,460 |
| Space | 15,868 | | | | 15,868 |
| Classified Programs | 1,613,137 | | 108,282 | 108,282 | 1,721,419 |
| Total Research, Development, Test & Evaluation | 20,270,499 | | 164,410 | 164,410 | 20,434,909 |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

| Summary Recap of Budget Activities | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|---|---|---|---|---|
| Basic Research | 604,634 | 679,772 | | 679,772 |
| Applied Research | 975,419 | 1,018,795 | | 1,018,795 |
| Advanced Technology Development | 900,071 | 851,710 | | 851,710 |
| Advanced Component Development & Prototypes | 4,210,640 | 4,139,479 | 33,300 | 4,172,779 |
| System Development & Demonstration | 6,037,909 | 5,863,466 | 1,100 | 5,864,566 |
| Management Support | 1,388,936 | 1,023,070 | | 1,023,070 |
| Operational Systems Development | 4,347,723 | 4,913,710 | 133,412 | 5,047,122 |
| Total Research, Development, Test & Evaluation | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 |
| **Summary Recap of FYDP Programs** | | | | |
| Strategic Forces | 192,820 | 240,310 | | 240,310 |
| General Purpose Forces | 1,514,837 | 1,914,231 | 16,130 | 1,930,361 |
| Intelligence and Communications | 816,404 | 608,772 | | 608,772 |
| Research and Development | 13,991,927 | 13,937,905 | 34,400 | 13,972,305 |
| Central Supply and Maintenance | 40,084 | 73,844 | | 73,844 |
| Administration and Associated Activities | 1,820 | 1,579 | | 1,579 |
| Space | 49,738 | 42,858 | | 42,858 |
| Classified Programs | 1,857,702 | 1,670,503 | 117,282 | 1,787,785 |
| Total Research, Development, Test & Evaluation | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

| Summary Recap of Budget Activities | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|---|---|---|---|---|---|
| Basic Research | 605,978 | | | | 605,978 |
| Applied Research | 936,453 | | | | 936,453 |
| Advanced Technology Development | 742,210 | | | | 742,210 |
| Advanced Component Development & Prototypes | 5,559,062 | | 40,006 | 40,006 | 5,599,068 |
| System Development & Demonstration | 6,332,033 | | 1,122 | 1,122 | 6,333,155 |
| Management Support | 990,464 | | | | 990,464 |
| Operational Systems Development | 5,104,299 | | 123,282 | 123,282 | 5,227,581 |
| Total Research, Development, Test & Evaluation | 20,270,499 | | 164,410 | 164,410 | 20,434,909 |
| **Summary Recap of FYDP Programs** | | | | | |
| Strategic Forces | 239,019 | | | | 239,019 |
| General Purpose Forces | 1,835,959 | | 15,000 | 15,000 | 1,850,959 |
| Intelligence and Communications | 692,089 | | | | 692,089 |
| Research and Development | 15,828,006 | | 41,128 | 41,128 | 15,869,134 |
| Central Supply and Maintenance | 44,961 | | | | 44,961 |
| Administration and Associated Activities | 1,460 | | | | 1,460 |
| Space | 15,868 | | | | 15,868 |
| Classified Programs | 1,613,137 | | 108,282 | 108,282 | 1,721,419 |
| Total Research, Development, Test & Evaluation | 20,270,499 | | 164,410 | 164,410 | 20,434,909 |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 1 | 0601103N | University Research Initiatives | 01 | 137,515 | 161,433 | | 161,433 | U |
| 2 | 0601152N | In-House Laboratory Independent Research | 01 | 19,035 | 19,237 | | 19,237 | U |
| 3 | 0601153N | Defense Research Sciences | 01 | 448,084 | 499,102 | | 499,102 | U |
| | Basic | Research | | 604,634 | 679,772 | | 679,772 | |
| 4 | 0602114N | Power Projection Applied Research | 02 | 23,028 | 27,643 | | 27,643 | U |
| 5 | 0602123N | Force Protection Applied Research | 02 | 182,614 | 180,549 | | 180,549 | U |
| 6 | 0602131M | Marine Corps Landing Force Technology | 02 | 54,526 | 63,212 | | 63,212 | U |
| 7 | 0602235N | Common Picture Applied Research | 02 | 35,846 | 36,348 | | 36,348 | U |
| 8 | 0602236N | Warfighter Sustainment Applied Research | 02 | 48,606 | 65,782 | | 65,782 | U |
| 9 | 0602271N | Electromagnetic Systems Applied Research | 02 | 83,640 | 76,497 | | 76,497 | U |
| 10 | 0602435N | Ocean Warfighting Environment Applied Research | 02 | 72,530 | 89,998 | | 89,998 | U |
| 11 | 0602651M | Joint Non-Lethal Weapons Applied Research | 02 | 6,230 | 6,299 | | 6,299 | U |
| 12 | 0602747N | Undersea Warfare Applied Research | 02 | 59,644 | 78,049 | | 78,049 | U |
| 13 | 0602750N | Future Naval Capabilities Applied Research | 02 | 147,219 | 137,701 | | 137,701 | U |
| 14 | 0602782N | Mine and Expeditionary Warfare Applied Research | 02 | 35,430 | 38,214 | | 38,214 | U |
| 15 | 0602792N | Innovative Naval Prototypes (INP) Applied Research | 02 | 160,884 | 154,085 | | 154,085 | U |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0601103N | University Research Initiatives | 01 | 116,850 | | | | 116,850 | U |
| 2 | 0601152N | In-House Laboratory Independent Research | 01 | 19,121 | | | | 19,121 | U |
| 3 | 0601153N | Defense Research Sciences | 01 | 470,007 | | | | 470,007 | U |
| | Basic | Research | | 605,978 | | | | 605,978 | |
| 4 | 0602114N | Power Projection Applied Research | 02 | 18,546 | | | | 18,546 | U |
| 5 | 0602123N | Force Protection Applied Research | 02 | 119,517 | | | | 119,517 | U |
| 6 | 0602131M | Marine Corps Landing Force Technology | 02 | 56,604 | | | | 56,604 | U |
| 7 | 0602235N | Common Picture Applied Research | 02 | 49,297 | | | | 49,297 | U |
| 8 | 0602236N | Warfighter Sustainment Applied Research | 02 | 63,825 | | | | 63,825 | U |
| 9 | 0602271N | Electromagnetic Systems Applied Research | 02 | 83,497 | | | | 83,497 | U |
| 10 | 0602435N | Ocean Warfighting Environment Applied Research | 02 | 63,894 | | | | 63,894 | U |
| 11 | 0602651M | Joint Non-Lethal Weapons Applied Research | 02 | 6,346 | | | | 6,346 | U |
| 12 | 0602747N | Undersea Warfare Applied Research | 02 | 57,075 | | | | 57,075 | U |
| 13 | 0602750N | Future Naval Capabilities Applied Research | 02 | 154,755 | | | | 154,755 | U |
| 14 | 0602782N | Mine and Expeditionary Warfare Applied Research | 02 | 36,074 | | | | 36,074 | U |
| 15 | 0602792N | Innovative Naval Prototypes (INP) Applied Research | 02 | 153,062 | | | | 153,062 | U |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 16 | 0602861N | Science and Technology Management - ONR Field Acitivities | 02 | 65,222 | 64,418 | | 64,418 | U |
| | | Applied Research | | 975,419 | 1,018,795 | | 1,018,795 | |
| 17 | 0603123N | Force Protection Advanced Technology | 03 | 52,785 | 32,615 | | 32,615 | U |
| 18 | 0603271N | Electromagnetic Systems Advanced Technology | 03 | 9,231 | 8,804 | | 8,804 | U |
| 19 | 0603640M | USMC Advanced Technology Demonstration (ATD) | 03 | 164,992 | 174,809 | | 174,809 | U |
| 20 | 0603651M | Joint Non-Lethal Weapons Technology Development | 03 | 13,090 | 13,313 | | 13,313 | U |
| 21 | 0603673N | Future Naval Capabilities Advanced Technology Development | 03 | 215,946 | 214,184 | | 214,184 | U |
| 22 | 0603680N | Manufacturing Technology Program | 03 | 66,173 | 58,657 | | 58,657 | U |
| 23 | 0603729N | Warfighter Protection Advanced Technology | 03 | 42,895 | 41,377 | | 41,377 | U |
| 24 | 0603747N | Undersea Warfare Advanced Technology | 03 | 9,657 | | | | U |
| 25 | 0603758N | Navy Warfighting Experiments and Demonstrations | 03 | 63,867 | 65,885 | | 65,885 | U |
| 26 | 0603782N | Mine and Expeditionary Warfare Advanced Technology | 03 | 14,826 | 39,672 | | 39,672 | U |
| 27 | 0603801N | Innovative Naval Prototypes (INP) Advanced Technology Development | 03 | 246,609 | 202,394 | | 202,394 | U |
| | | Advanced Technology Development | | 900,071 | 851,710 | | 851,710 | |
| 28 | 0603207N | Air/Ocean Tactical Applications | 04 | 47,422 | 29,747 | | 29,747 | U |
| 29 | 0603216N | Aviation Survivability | 04 | 5,450 | 7,050 | | 7,050 | U |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 0602861N | Science and Technology Management - ONR Field Acitivities | 02 | 73,961 | | | | 73,961 | U |
| | | Applied Research | | 936,453 | | | | 936,453 | |
| 17 | 0603123N | Force Protection Advanced Technology | 03 | 35,286 | | | | 35,286 | U |
| 18 | 0603271N | Electromagnetic Systems Advanced Technology | 03 | 9,499 | | | | 9,499 | U |
| 19 | 0603640M | USMC Advanced Technology Demonstration (ATD) | 03 | 172,847 | | | | 172,847 | U |
| 20 | 0603651M | Joint Non-Lethal Weapons Technology Development | 03 | 13,307 | | | | 13,307 | U |
| 21 | 0603673N | Future Naval Capabilities Advanced Technology Development | 03 | 231,907 | | | | 231,907 | U |
| 22 | 0603680N | Manufacturing Technology Program | 03 | 60,138 | | | | 60,138 | U |
| 23 | 0603729N | Warfighter Protection Advanced Technology | 03 | 4,849 | | | | 4,849 | U |
| 24 | 0603747N | Undersea Warfare Advanced Technology | 03 | | | | | | U |
| 25 | 0603758N | Navy Warfighting Experiments and Demonstrations | 03 | 67,739 | | | | 67,739 | U |
| 26 | 0603782N | Mine and Expeditionary Warfare Advanced Technology | 03 | 13,335 | | | | 13,335 | U |
| 27 | 0603801N | Innovative Naval Prototypes (INP) Advanced Technology Development | 03 | 133,303 | | | | 133,303 | U |
| | | Advanced Technology Development | | 742,210 | | | | 742,210 | |
| 28 | 0603207N | Air/Ocean Tactical Applications | 04 | 32,643 | | 2,400 | 2,400 | 35,043 | U |
| 29 | 0603216N | Aviation Survivability | 04 | 11,919 | | | | 11,919 | U |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 30 | 0603251N | Aircraft Systems | 04 | 693 | 793 | | 793 | U |
| 31 | 0603254N | ASW Systems Development | 04 | 7,466 | 7,044 | | 7,044 | U |
| 32 | 0603261N | Tactical Airborne Reconnaissance | 04 | 3,692 | 3,540 | | 3,540 | U |
| 33 | 0603382N | Advanced Combat Systems Technology | 04 | 4,450 | 39,240 | | 39,240 | U |
| 34 | 0603502N | Surface and Shallow Water Mine Countermeasures | 04 | 69,906 | 120,348 | | 120,348 | U |
| 35 | 0603506N | Surface Ship Torpedo Defense | 04 | 24,174 | 7,100 | | 7,100 | U |
| 36 | 0603512N | Carrier Systems Development | 04 | 9,184 | 5,440 | | 5,440 | U |
| 37 | 0603525N | PILOT FISH | 04 | 111,278 | 136,533 | | 136,533 | U |
| 38 | 0603527N | RETRACT LARCH | 04 | 32,608 | 11,745 | 18,000 | 29,745 | U |
| 39 | 0603536N | RETRACT JUNIPER | 04 | 126,210 | 113,679 | | 113,679 | U |
| 40 | 0603542N | Radiological Control | 04 | 716 | 740 | | 740 | U |
| 41 | 0603553N | Surface ASW | 04 | 1,092 | 1,122 | | 1,122 | U |
| 42 | 0603561N | Advanced Submarine System Development | 04 | 91,927 | 105,809 | | 105,809 | U |
| 43 | 0603562N | Submarine Tactical Warfare Systems | 04 | 13,597 | 12,374 | | 12,374 | U |
| 44 | 0603563N | Ship Concept Advanced Design | 04 | 23,856 | 74,603 | | 74,603 | U |
| 45 | 0603564N | Ship Preliminary Design & Feasibility Studies | 04 | 18,369 | 13,348 | | 13,348 | U |
| 46 | 0603570N | Advanced Nuclear Power Systems | 04 | 329,500 | 256,137 | | 256,137 | U |
| 47 | 0603573N | Advanced Surface Machinery Systems | 04 | 22,406 | 27,109 | | 27,109 | U |
| 48 | 0603576N | CHALK EAGLE | 04 | 188,927 | 29,353 | | 29,353 | U |

Department of the Navy
FY 2020 President's Budget
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Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 30 | 0603251N | Aircraft Systems | 04 | 1,473 | | | | 1,473 | U |
| 31 | 0603254N | ASW Systems Development | 04 | 7,172 | | | | 7,172 | U |
| 32 | 0603261N | Tactical Airborne Reconnaissance | 04 | 3,419 | | | | 3,419 | U |
| 33 | 0603382N | Advanced Combat Systems Technology | 04 | 64,694 | | | | 64,694 | U |
| 34 | 0603502N | Surface and Shallow Water Mine Countermeasures | 04 | 507,000 | | | | 507,000 | U |
| 35 | 0603506N | Surface Ship Torpedo Defense | 04 | 15,800 | | | | 15,800 | U |
| 36 | 0603512N | Carrier Systems Development | 04 | 4,997 | | | | 4,997 | U |
| 37 | 0603525N | PILOT FISH | 04 | 291,148 | | | | 291,148 | U |
| 38 | 0603527N | RETRACT LARCH | 04 | 11,980 | | 22,000 | 22,000 | 33,980 | U |
| 39 | 0603536N | RETRACT JUNIPER | 04 | 129,163 | | | | 129,163 | U |
| 40 | 0603542N | Radiological Control | 04 | 689 | | | | 689 | U |
| 41 | 0603553N | Surface ASW | 04 | 1,137 | | | | 1,137 | U |
| 42 | 0603561N | Advanced Submarine System Development | 04 | 148,756 | | | | 148,756 | U |
| 43 | 0603562N | Submarine Tactical Warfare Systems | 04 | 11,192 | | | | 11,192 | U |
| 44 | 0603563N | Ship Concept Advanced Design | 04 | 81,846 | | | | 81,846 | U |
| 45 | 0603564N | Ship Preliminary Design & Feasibility Studies | 04 | 69,084 | | | | 69,084 | U |
| 46 | 0603570N | Advanced Nuclear Power Systems | 04 | 181,652 | | | | 181,652 | U |
| 47 | 0603573N | Advanced Surface Machinery Systems | 04 | 25,408 | | | | 25,408 | U |
| 48 | 0603576N | CHALK EAGLE | 04 | 64,877 | | | | 64,877 | U |

Department of the Navy
FY 2020 President's Budget
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Total Obligational Authority
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Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 49 | 0603581N | Littoral Combat Ship (LCS) | 04 | 49,308 | 37,997 | | 37,997 | U |
| 50 | 0603582N | Combat System Integration | 04 | 15,471 | 16,351 | | 16,351 | U |
| 51 | 0603595N | Ohio Replacement | 04 | 775,624 | 542,846 | | 542,846 | U |
| 52 | 0603596N | LCS Mission Modules | 04 | 100,470 | 103,559 | | 103,559 | U |
| 53 | 0603597N | Automated Test and Analysis | 04 | 24,145 | 37,931 | | 37,931 | U |
| 54 | 0603599N | Frigate Development | 04 | 137,655 | 132,775 | | 132,775 | U |
| 55 | 0603609N | Conventional Munitions | 04 | 13,699 | 9,307 | | 9,307 | U |
| 56 | 0603635M | Marine Corps Ground Combat/Support System | 04 | 771 | | | | U |
| 57 | 0603654N | Joint Service Explosive Ordnance Development | 04 | 77,409 | 47,857 | 13,900 | 61,757 | U |
| 58 | 0603713N | Ocean Engineering Technology Development | 04 | 8,853 | 5,915 | | 5,915 | U |
| 59 | 0603721N | Environmental Protection | 04 | 23,237 | 19,811 | | 19,811 | U |
| 60 | 0603724N | Navy Energy Program | 04 | 42,425 | 32,656 | | 32,656 | U |
| 61 | 0603725N | Facilities Improvement | 04 | 2,794 | 5,301 | | 5,301 | U |
| 62 | 0603734N | CHALK CORAL | 04 | 237,402 | 267,477 | | 267,477 | U |
| 63 | 0603739N | Navy Logistic Productivity | 04 | 2,882 | 2,913 | | 2,913 | U |
| 64 | 0603746N | RETRACT MAPLE | 04 | 287,865 | 318,878 | | 318,878 | U |
| 65 | 0603748N | LINK PLUMERIA | 04 | 375,595 | 381,268 | | 381,268 | U |
| 66 | 0603751N | RETRACT ELM | 04 | 52,080 | 58,192 | | 58,192 | U |
| 67 | 0603764N | LINK EVERGREEN | 04 | 47,115 | | | | U |

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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 49 | 0603581N | Littoral Combat Ship (LCS) | 04 | 9,934 | | | | 9,934 | U |
| 50 | 0603582N | Combat System Integration | 04 | 17,251 | | | | 17,251 | U |
| 51 | 0603595N | Ohio Replacement | 04 | 419,051 | | | | 419,051 | U |
| 52 | 0603596N | LCS Mission Modules | 04 | 108,505 | | | | 108,505 | U |
| 53 | 0603597N | Automated Test and Analysis | 04 | 7,653 | | | | 7,653 | U |
| 54 | 0603599N | Frigate Development | 04 | 59,007 | | | | 59,007 | U |
| 55 | 0603609N | Conventional Munitions | 04 | 9,988 | | | | 9,988 | U |
| 56 | 0603635M | Marine Corps Ground Combat/Support System | 04 | 86,464 | | | | 86,464 | U |
| 57 | 0603654N | Joint Service Explosive Ordnance Development | 04 | 33,478 | | 14,178 | 14,178 | 47,656 | U |
| 58 | 0603713N | Ocean Engineering Technology Development | 04 | 5,619 | | | | 5,619 | U |
| 59 | 0603721N | Environmental Protection | 04 | 20,564 | | | | 20,564 | U |
| 60 | 0603724N | Navy Energy Program | 04 | 26,514 | | | | 26,514 | U |
| 61 | 0603725N | Facilities Improvement | 04 | 3,440 | | | | 3,440 | U |
| 62 | 0603734N | CHALK CORAL | 04 | 346,800 | | | | 346,800 | U |
| 63 | 0603739N | Navy Logistic Productivity | 04 | 3,857 | | | | 3,857 | U |
| 64 | 0603746N | RETRACT MAPLE | 04 | 258,519 | | | | 258,519 | U |
| 65 | 0603748N | LINK PLUMERIA | 04 | 403,909 | | | | 403,909 | U |
| 66 | 0603751N | RETRACT ELM | 04 | 63,434 | | | | 63,434 | U |
| 67 | 0603764N | LINK EVERGREEN | 04 | 184,110 | | | | 184,110 | U |

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Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 68 | 0603790N | NATO Research and Development | 04 | 8,752 | 9,652 | | 9,652 | U |
| 69 | 0603795N | Land Attack Technology | 04 | 16,684 | 5,700 | 1,400 | 7,100 | U |
| 70 | 0603851M | Joint Non-Lethal Weapons Testing | 04 | 23,934 | 27,581 | | 27,581 | U |
| 71 | 0603860N | Joint Precision Approach and Landing Systems - Dem/Val | 04 | 103,984 | 101,566 | | 101,566 | U |
| 72 | 0603925N | Directed Energy and Electric Weapon Systems | 04 | 92,856 | 142,814 | | 142,814 | U |
| 73 | 0604014N | F/A -18 Infrared Search and Track (IRST) | 04 | | 108,689 | | 108,689 | U |
| 74 | 0604027N | Digital Warfare Office | 04 | 14,476 | 20,000 | | 20,000 | U |
| 75 | 0604028N | Small and Medium Unmanned Undersea Vehicles | 04 | | 16,717 | | 16,717 | U |
| 76 | 0604029N | Unmanned Undersea Vehicle Core Technologies | 04 | | 27,483 | | 27,483 | U |
| 77 | 0604030N | Rapid Prototyping, Experimentation and Demonstration. | 04 | 25,225 | 28,596 | | 28,596 | U |
| 78 | 0604031N | Large Unmanned Undersea Vehicles | 04 | 23,886 | 60,304 | | 60,304 | U |
| 79 | 0604112N | Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80) | 04 | 82,549 | 83,121 | | 83,121 | U |
| 80 | 0604126N | Littoral Airborne MCM | 04 | 11,314 | 14,625 | | 14,625 | U |
| 81 | 0604127N | Surface Mine Countermeasures | 04 | 12,525 | 15,527 | | 15,527 | U |
| 82 | 0604272N | Tactical Air Directional Infrared Countermeasures (TADIRCM) | 04 | 51,311 | 47,278 | | 47,278 | U |
| 83 | 0604286M | Marine Corps Additive Manufacturing Technology Development | 04 | 6,168 | | | | U |

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(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 68 | 0603790N | NATO Research and Development | 04 | 7,697 | | | | 7,697 | U |
| 69 | 0603795N | Land Attack Technology | 04 | 9,086 | | 1,428 | 1,428 | 10,514 | U |
| 70 | 0603851M | Joint Non-Lethal Weapons Testing | 04 | 28,466 | | | | 28,466 | U |
| 71 | 0603860N | Joint Precision Approach and Landing Systems - Dem/Val | 04 | 51,341 | | | | 51,341 | U |
| 72 | 0603925N | Directed Energy and Electric Weapon Systems | 04 | 118,169 | | | | 118,169 | U |
| 73 | 0604014N | F/A -18 Infrared Search and Track (IRST) | 04 | 113,456 | | | | 113,456 | U |
| 74 | 0604027N | Digital Warfare Office | 04 | 50,120 | | | | 50,120 | U |
| 75 | 0604028N | Small and Medium Unmanned Undersea Vehicles | 04 | 32,527 | | | | 32,527 | U |
| 76 | 0604029N | Unmanned Undersea Vehicle Core Technologies | 04 | 54,376 | | | | 54,376 | U |
| 77 | 0604030N | Rapid Prototyping, Experimentation and Demonstration. | 04 | 36,197 | | | | 36,197 | U |
| 78 | 0604031N | Large Unmanned Undersea Vehicles | 04 | 68,310 | | | | 68,310 | U |
| 79 | 0604112N | Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78 - 80) | 04 | 121,310 | | | | 121,310 | U |
| 80 | 0604126N | Littoral Airborne MCM | 04 | 17,248 | | | | 17,248 | U |
| 81 | 0604127N | Surface Mine Countermeasures | 04 | 18,735 | | | | 18,735 | U |
| 82 | 0604272N | Tactical Air Directional Infrared Countermeasures (TADIRCM) | 04 | 68,346 | | | | 68,346 | U |
| 83 | 0604286M | Marine Corps Additive Manufacturing Technology Development | 04 | | | | | | U |

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| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 84 | 0604289M | Next Generation Logistics | 04 | | 6,073 | | 6,073 | U |
| 85 | 0604320M | Rapid Technology Capability Prototype | 04 | 16,443 | 7,107 | | 7,107 | U |
| 86 | 0604454N | LX (R) | 04 | 9,431 | 5,549 | | 5,549 | U |
| 87 | 0604536N | Advanced Undersea Prototyping | 04 | 64,038 | 112,669 | | 112,669 | U |
| 88 | 0604636N | Counter Unmanned Aircraft Systems (C-UAS) | 04 | | | | | U |
| 89 | 0604659N | Precision Strike Weapons Development Program | 04 | 20,279 | 91,833 | | 91,833 | U |
| 90 | 0604707N | Space and Electronic Warfare (SEW) Architecture/Engineering Support | 04 | 41,214 | 7,230 | | 7,230 | U |
| 91 | 0604786N | Offensive Anti-Surface Warfare Weapon Development | 04 | 163,843 | 139,261 | | 139,261 | U |
| 92 | 0303354N | ASW Systems Development - MIP | 04 | 8,278 | 8,889 | | 8,889 | U |
| 93 | 0304240M | Advanced Tactical Unmanned Aircraft System | 04 | 5,200 | 17,561 | | 17,561 | U |
| 94 | 0304240N | Advanced Tactical Unmanned Aircraft System | 04 | | 9,300 | | 9,300 | U |
| 95 | 0304270N | Electronic Warfare Development - MIP | 04 | 527 | 466 | | 466 | U |
| | | Advanced Component Development & Prototypes | | 4,210,640 | 4,139,479 | 33,300 | 4,172,779 | |
| 96 | 0603208N | Training System Aircraft | 05 | 16,343 | 12,798 | | 12,798 | U |
| 97 | 0604212N | Other Helo Development | 05 | 26,423 | 23,579 | | 23,579 | U |
| 98 | 0604214M | AV-8B Aircraft - Eng Dev | 05 | | 46,363 | | 46,363 | U |
| 99 | 0604214N | AV-8B Aircraft - Eng Dev | 05 | 41,261 | | | | U |

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Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 84 | 0604289M | Next Generation Logistics | 04 | 4,420 | | | | 4,420 | U |
| 85 | 0604320M | Rapid Technology Capability Prototype | 04 | 4,558 | | | | 4,558 | U |
| 86 | 0604454N | LX (R) | 04 | 12,500 | | | | 12,500 | U |
| 87 | 0604536N | Advanced Undersea Prototyping | 04 | 181,967 | | | | 181,967 | U |
| 88 | 0604636N | Counter Unmanned Aircraft Systems (C-UAS) | 04 | 5,500 | | | | 5,500 | U |
| 89 | 0604659N | Precision Strike Weapons Development Program | 04 | 718,148 | | | | 718,148 | U |
| 90 | 0604707N | Space and Electronic Warfare (SEW) Architecture/Engineering Support | 04 | 5,263 | | | | 5,263 | U |
| 91 | 0604786N | Offensive Anti-Surface Warfare Weapon Development | 04 | 65,419 | | | | 65,419 | U |
| 92 | 0303354N | ASW Systems Development - MIP | 04 | 9,991 | | | | 9,991 | U |
| 93 | 0304240M | Advanced Tactical Unmanned Aircraft System | 04 | 21,157 | | | | 21,157 | U |
| 94 | 0304240N | Advanced Tactical Unmanned Aircraft System | 04 | | | | | | U |
| 95 | 0304270N | Electronic Warfare Development - MIP | 04 | 609 | | | | 609 | U |
| | | Advanced Component Development & Prototypes | | 5,559,062 | | 40,006 | 40,006 | 5,599,068 | |
| 96 | 0603208N | Training System Aircraft | 05 | 15,514 | | | | 15,514 | U |
| 97 | 0604212N | Other Helo Development | 05 | 28,835 | | | | 28,835 | U |
| 98 | 0604214M | AV-8B Aircraft - Eng Dev | 05 | 27,441 | | | | 27,441 | U |
| 99 | 0604214N | AV-8B Aircraft - Eng Dev | 05 | | | | | | U |

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| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 100 | 0604215N | Standards Development | 05 | 2,711 | 3,771 | | 3,771 | U |
| 101 | 0604216N | Multi-Mission Helicopter Upgrade Development | 05 | 5,313 | 16,611 | | 16,611 | U |
| 102 | 0604218N | Air/Ocean Equipment Engineering | 05 | 5,583 | 15,582 | | 15,582 | U |
| 103 | 0604221N | P-3 Modernization Program | 05 | 1,331 | 2,134 | | 2,134 | U |
| 104 | 0604230N | Warfare Support System | 05 | 19,004 | 9,729 | | 9,729 | U |
| 105 | 0604231N | Tactical Command System | 05 | 37,609 | 54,300 | | 54,300 | U |
| 106 | 0604234N | Advanced Hawkeye | 05 | 283,497 | 210,565 | | 210,565 | U |
| 107 | 0604245M | H-1 Upgrades | 05 | | 54,320 | | 54,320 | U |
| 108 | 0604245N | H-1 Upgrades | 05 | 59,806 | | | | U |
| 109 | 0604261N | Acoustic Search Sensors | 05 | 36,310 | 42,485 | | 42,485 | U |
| 110 | 0604262N | V-22A | 05 | 176,804 | 135,504 | | 135,504 | U |
| 111 | 0604264N | Air Crew Systems Development | 05 | 7,174 | 30,980 | | 30,980 | U |
| 112 | 0604269N | EA-18 | 05 | 137,029 | 242,719 | | 242,719 | U |
| 113 | 0604270N | Electronic Warfare Development | 05 | 50,613 | 83,624 | | 83,624 | U |
| 114 | 0604273M | Executive Helo Development | 05 | | 245,064 | | 245,064 | U |
| 115 | 0604273N | Executive Helo Development | 05 | 430,647 | | | | U |
| 116 | 0604274N | Next Generation Jammer (NGJ) | 05 | 584,538 | 449,429 | | 449,429 | U |
| 117 | 0604280N | Joint Tactical Radio System - Navy (JTRS-Navy) | 05 | 5,172 | 3,272 | | 3,272 | U |
| 118 | 0604282N | Next Generation Jammer (NGJ) Increment II | 05 | 55,194 | 93,482 | | 93,482 | U |

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| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 100 | 0604215N | Standards Development | 05 | 3,642 | | | | 3,642 | U |
| 101 | 0604216N | Multi-Mission Helicopter Upgrade Development | 05 | 19,196 | | | | 19,196 | U |
| 102 | 0604218N | Air/Ocean Equipment Engineering | 05 | | | | | | U |
| 103 | 0604221N | P-3 Modernization Program | 05 | | | | | | U |
| 104 | 0604230N | Warfare Support System | 05 | 8,601 | | | | 8,601 | U |
| 105 | 0604231N | Tactical Command System | 05 | 77,232 | | | | 77,232 | U |
| 106 | 0604234N | Advanced Hawkeye | 05 | 232,752 | | | | 232,752 | U |
| 107 | 0604245M | H-1 Upgrades | 05 | 65,359 | | | | 65,359 | U |
| 108 | 0604245N | H-1 Upgrades | 05 | | | | | | U |
| 109 | 0604261N | Acoustic Search Sensors | 05 | 47,013 | | | | 47,013 | U |
| 110 | 0604262N | V-22A | 05 | 185,105 | | | | 185,105 | U |
| 111 | 0604264N | Air Crew Systems Development | 05 | 21,172 | | | | 21,172 | U |
| 112 | 0604269N | EA-18 | 05 | 143,585 | | | | 143,585 | U |
| 113 | 0604270N | Electronic Warfare Development | 05 | 116,811 | | | | 116,811 | U |
| 114 | 0604273M | Executive Helo Development | 05 | 187,436 | | | | 187,436 | U |
| 115 | 0604273N | Executive Helo Development | 05 | | | | | | U |
| 116 | 0604274N | Next Generation Jammer (NGJ) | 05 | 524,261 | | | | 524,261 | U |
| 117 | 0604280N | Joint Tactical Radio System - Navy (JTRS-Navy) | 05 | 192,345 | | | | 192,345 | U |
| 118 | 0604282N | Next Generation Jammer (NGJ) Increment II | 05 | 111,068 | | | | 111,068 | U |

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Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 119 | 0604307N | Surface Combatant Combat System Engineering | 05 | 340,760 | 379,116 | | 379,116 | U |
| 120 | 0604311N | LPD-17 Class Systems Integration | 05 | 665 | 939 | | 939 | U |
| 121 | 0604329N | Small Diameter Bomb (SDB) | 05 | 99,286 | 96,980 | | 96,980 | U |
| 122 | 0604366N | Standard Missile Improvements | 05 | 114,802 | 190,881 | | 190,881 | U |
| 123 | 0604373N | Airborne MCM | 05 | 15,203 | 8,351 | | 8,351 | U |
| 124 | 0604378N | Naval Integrated Fire Control - Counter Air Systems Engineering | 05 | 24,801 | 33,429 | | 33,429 | U |
| 125 | 0604501N | Advanced Above Water Sensors | 05 | 84,507 | 33,884 | | 33,884 | U |
| 126 | 0604503N | SSN-688 and Trident Modernization | 05 | 142,167 | 126,932 | | 126,932 | U |
| 127 | 0604504N | Air Control | 05 | 68,012 | 61,498 | | 61,498 | U |
| 128 | 0604512N | Shipboard Aviation Systems | 05 | 174,034 | 13,710 | | 13,710 | U |
| 129 | 0604518N | Combat Information Center Conversion | 05 | 4,294 | 19,263 | | 19,263 | U |
| 130 | 0604522N | Air and Missile Defense Radar (AMDR) System | 05 | 49,643 | 27,008 | | 27,008 | U |
| 131 | 0604530N | Advanced Arresting Gear (AAG) | 05 | | 172,173 | | 172,173 | U |
| 132 | 0604558N | New Design SSN | 05 | 117,887 | 180,233 | | 180,233 | U |
| 133 | 0604562N | Submarine Tactical Warfare System | 05 | 44,703 | 80,324 | | 80,324 | U |
| 134 | 0604567N | Ship Contract Design/ Live Fire T&E | 05 | 65,857 | 71,062 | | 71,062 | U |
| 135 | 0604574N | Navy Tactical Computer Resources | 05 | 4,745 | 4,642 | | 4,642 | U |
| 136 | 0604580N | Virginia Payload Module (VPM) | 05 | 70,579 | | | | U |
| 137 | 0604601N | Mine Development | 05 | 24,640 | 21,747 | | 21,747 | U |

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Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 119 | 0604307N | Surface Combatant Combat System Engineering | 05 | 415,625 | | | | 415,625 | U |
| 120 | 0604311N | LPD-17 Class Systems Integration | 05 | 640 | | | | 640 | U |
| 121 | 0604329N | Small Diameter Bomb (SDB) | 05 | 50,096 | | | | 50,096 | U |
| 122 | 0604366N | Standard Missile Improvements | 05 | 232,391 | | | | 232,391 | U |
| 123 | 0604373N | Airborne MCM | 05 | 10,916 | | | | 10,916 | U |
| 124 | 0604378N | Naval Integrated Fire Control - Counter Air Systems Engineering | 05 | 33,379 | | | | 33,379 | U |
| 125 | 0604501N | Advanced Above Water Sensors | 05 | 34,554 | | | | 34,554 | U |
| 126 | 0604503N | SSN-688 and Trident Modernization | 05 | 84,663 | | | | 84,663 | U |
| 127 | 0604504N | Air Control | 05 | 44,923 | | | | 44,923 | U |
| 128 | 0604512N | Shipboard Aviation Systems | 05 | 10,632 | | | | 10,632 | U |
| 129 | 0604518N | Combat Information Center Conversion | 05 | 16,094 | | | | 16,094 | U |
| 130 | 0604522N | Air and Missile Defense Radar (AMDR) System | 05 | 55,349 | | | | 55,349 | U |
| 131 | 0604530N | Advanced Arresting Gear (AAG) | 05 | 123,490 | | | | 123,490 | U |
| 132 | 0604558N | New Design SSN | 05 | 121,010 | | | | 121,010 | U |
| 133 | 0604562N | Submarine Tactical Warfare System | 05 | 62,426 | | | | 62,426 | U |
| 134 | 0604567N | Ship Contract Design/ Live Fire T&E | 05 | 46,809 | | | | 46,809 | U |
| 135 | 0604574N | Navy Tactical Computer Resources | 05 | 3,692 | | | | 3,692 | U |
| 136 | 0604580N | Virginia Payload Module (VPM) | 05 | | | | | | U |
| 137 | 0604601N | Mine Development | 05 | 28,964 | | | | 28,964 | U |

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| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 138 | 0604610N | Lightweight Torpedo Development | 05 | 21,057 | 63,147 | | 63,147 | U |
| 139 | 0604654N | Joint Service Explosive Ordnance Development | 05 | 7,449 | 7,107 | | 7,107 | U |
| 140 | 0604657M | USMC Ground Combat/Supporting Arms Systems - Eng Dev | 05 | | | | | U |
| 141 | 0604703N | Personnel, Training, Simulation, and Human Factors | 05 | 24,229 | 6,539 | | 6,539 | U |
| 142 | 0604727N | Joint Standoff Weapon Systems | 05 | 418 | 441 | | 441 | U |
| 143 | 0604755N | Ship Self Defense (Detect & Control) | 05 | 160,475 | 180,391 | 1,100 | 181,491 | U |
| 144 | 0604756N | Ship Self Defense (Engage: Hard Kill) | 05 | 214,132 | 193,244 | | 193,244 | U |
| 145 | 0604757N | Ship Self Defense (Engage: Soft Kill/EW) | 05 | 126,037 | 120,210 | | 120,210 | U |
| 146 | 0604761N | Intelligence Engineering | 05 | 44,855 | 25,965 | | 25,965 | U |
| 147 | 0604771N | Medical Development | 05 | 36,392 | 38,095 | | 38,095 | U |
| 148 | 0604777N | Navigation/ID System | 05 | 74,984 | 126,026 | | 126,026 | U |
| 149 | 0604800M | Joint Strike Fighter (JSF) - EMD | 05 | 157,162 | 66,566 | | 66,566 | U |
| 150 | 0604800N | Joint Strike Fighter (JSF) - EMD | 05 | 105,648 | 65,494 | | 65,494 | U |
| 151 | 0604810M | Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps | 05 | 139,369 | | | | U |
| 152 | 0604810N | Joint Strike Fighter Follow On Modernization (FoM) - Navy | 05 | 138,308 | | | | U |
| 153 | 0605013M | Information Technology Development | 05 | 14,497 | 11,030 | | 11,030 | U |
| 154 | 0605013N | Information Technology Development | 05 | 120,387 | 242,110 | | 242,110 | U |

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| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 138 | 0604610N | Lightweight Torpedo Development | 05 | 148,349 | | | | 148,349 | U |
| 139 | 0604654N | Joint Service Explosive Ordnance Development | 05 | 8,237 | | | | 8,237 | U |
| 140 | 0604657M | USMC Ground Combat/Supporting Arms Systems - Eng Dev | 05 | 22,000 | | | | 22,000 | U |
| 141 | 0604703N | Personnel, Training, Simulation, and Human Factors | 05 | 5,500 | | | | 5,500 | U |
| 142 | 0604727N | Joint Standoff Weapon Systems | 05 | 18,725 | | | | 18,725 | U |
| 143 | 0604755N | Ship Self Defense (Detect & Control) | 05 | 192,603 | | 1,122 | 1,122 | 193,725 | U |
| 144 | 0604756N | Ship Self Defense (Engage: Hard Kill) | 05 | 137,268 | | | | 137,268 | U |
| 145 | 0604757N | Ship Self Defense (Engage: Soft Kill/EW) | 05 | 97,363 | | | | 97,363 | U |
| 146 | 0604761N | Intelligence Engineering | 05 | 26,710 | | | | 26,710 | U |
| 147 | 0604771N | Medical Development | 05 | 8,181 | | | | 8,181 | U |
| 148 | 0604777N | Navigation/ID System | 05 | 40,755 | | | | 40,755 | U |
| 149 | 0604800M | Joint Strike Fighter (JSF) - EMD | 05 | 1,710 | | | | 1,710 | U |
| 150 | 0604800N | Joint Strike Fighter (JSF) - EMD | 05 | 1,490 | | | | 1,490 | U |
| 151 | 0604810M | Joint Strike Fighter Follow On Modernization (FoM) - Marine Corps | 05 | | | | | | U |
| 152 | 0604810N | Joint Strike Fighter Follow On Modernization (FoM) - Navy | 05 | | | | | | U |
| 153 | 0605013M | Information Technology Development | 05 | 1,494 | | | | 1,494 | U |
| 154 | 0605013N | Information Technology Development | 05 | 384,162 | | | | 384,162 | U |

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| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 155 | 0605024N | Anti-Tamper Technology Support | 05 | 3,900 | 5,618 | | 5,618 | U |
| 156 | 0605212M | CH-53K RDTE | 05 | | 336,945 | | 336,945 | U |
| 157 | 0605212N | CH-53K RDTE | 05 | 329,367 | | | | U |
| 158 | 0605215N | Mission Planning | 05 | 36,108 | 32,714 | | 32,714 | U |
| 159 | 0605217N | Common Avionics | 05 | 47,338 | 51,486 | | 51,486 | U |
| 160 | 0605220N | Ship to Shore Connector (SSC) | 05 | 31,583 | 1,444 | | 1,444 | U |
| 161 | 0605327N | T-AO 205 Class | 05 | 1,895 | 1,298 | | 1,298 | U |
| 162 | 0605414N | Unmanned Carrier Aviation (UCA) | 05 | 194,176 | 518,942 | | 518,942 | U |
| 163 | 0605450M | Joint Air-to-Ground Missile (JAGM) | 05 | | 16,559 | | 16,559 | U |
| 164 | 0605450N | Joint Air-to-Ground Missile (JAGM) | 05 | 14,457 | | | | U |
| 165 | 0605500N | Multi-mission Maritime Aircraft (MMA) | 05 | 11,422 | 34,196 | | 34,196 | U |
| 166 | 0605504N | Multi-Mission Maritime (MMA) Increment III | 05 | 123,752 | 163,809 | | 163,809 | U |
| 167 | 0605611M | Marine Corps Assault Vehicles System Development & Demonstration | 05 | 150,381 | 66,137 | | 66,137 | U |
| 168 | 0605813M | Joint Light Tactical Vehicle (JLTV) System Development & Demonstration | 05 | 19,467 | | | | U |
| 169 | 0204202N | DDG-1000 | 05 | 134,664 | 140,264 | | 140,264 | U |
| 170 | 0303267N | Auctioned Spectrum Relocation Fund*** | 05 | 97,558 | | | | U |
| 171 | 0303467N | SENSR Spectrum Pipeline SRF*** | 05 | 1,773 | | | | U |
| 172 | 0304785N | Tactical Cryptologic Systems | 05 | 22,762 | 42,398 | | 42,398 | U |

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 155 | 0605024N | Anti-Tamper Technology Support | 05 | 4,882 | | | | 4,882 | U |
| 156 | 0605212M | CH-53K RDTE | 05 | 516,955 | | | | 516,955 | U |
| 157 | 0605212N | CH-53K RDTE | 05 | | | | | | U |
| 158 | 0605215N | Mission Planning | 05 | 75,886 | | | | 75,886 | U |
| 159 | 0605217N | Common Avionics | 05 | 43,187 | | | | 43,187 | U |
| 160 | 0605220N | Ship to Shore Connector (SSC) | 05 | 4,909 | | | | 4,909 | U |
| 161 | 0605327N | T-AO 205 Class | 05 | 1,682 | | | | 1,682 | U |
| 162 | 0605414N | Unmanned Carrier Aviation (UCA) | 05 | 671,258 | | | | 671,258 | U |
| 163 | 0605450M | Joint Air-to-Ground Missile (JAGM) | 05 | 18,393 | | | | 18,393 | U |
| 164 | 0605450N | Joint Air-to-Ground Missile (JAGM) | 05 | | | | | | U |
| 165 | 0605500N | Multi-mission Maritime Aircraft (MMA) | 05 | 21,472 | | | | 21,472 | U |
| 166 | 0605504N | Multi-Mission Maritime (MMA) Increment III | 05 | 177,234 | | | | 177,234 | U |
| 167 | 0605611M | Marine Corps Assault Vehicles System Development & Demonstration | 05 | 77,322 | | | | 77,322 | U |
| 168 | 0605813M | Joint Light Tactical Vehicle (JLTV) System Development & Demonstration | 05 | 2,105 | | | | 2,105 | U |
| 169 | 0204202N | DDG-1000 | 05 | 111,435 | | | | 111,435 | U |
| 170 | 0303267N | Auctioned Spectrum Relocation Fund*** | 05 | | | | | | U |
| 171 | 0303467N | SENSR Spectrum Pipeline SRF*** | 05 | | | | | | U |
| 172 | 0304785N | Tactical Cryptologic Systems | 05 | 101,339 | | | | 101,339 | U |

***Funding in this Program Element was transferred during the year of execution from the Spectrum Relocation Fund (SRF) in support of the Advanced Wireless Services 3 (AWS-3) auction and is associated with the reallocation or sharing of the 1755-1780 MHz and 1695-1710 MHz bands. The SRF is administered by the Office of Management and Budget (OMB), which approves SRF transfers to federal agencies on an annual basis in consultation with the National Telecommunications and Information Administration (NTIA).

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| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 173 | 0306250M | Cyber Operations Technology Development | 05 | 2,960 | 6,808 | | 6,808 | U |
| | | System Development & Demonstration | | 6,037,909 | 5,863,466 | 1,100 | 5,864,566 | |
| 174 | 0604256N | Threat Simulator Development | 06 | 89,491 | 94,576 | | 94,576 | U |
| 175 | 0604258N | Target Systems Development | 06 | 18,737 | 10,981 | | 10,981 | U |
| 176 | 0604759N | Major T&E Investment | 06 | 68,977 | 90,514 | | 90,514 | U |
| 177 | 0605126N | Joint Theater Air and Missile Defense Organization | 06 | 140 | 48 | | 48 | U |
| 178 | 0605152N | Studies and Analysis Support - Navy | 06 | 4,438 | 3,942 | | 3,942 | U |
| 179 | 0605154N | Center for Naval Analyses | 06 | 44,302 | 42,693 | | 42,693 | U |
| 180 | 0605285N | Next Generation Fighter | 06 | | 5,000 | | 5,000 | U |
| 181 | 0605502N | Small Business Innovative Research | 06 | 407,133 | | | | U |
| 182 | 0605804N | Technical Information Services | 06 | 1,280 | 1,029 | | 1,029 | U |
| 183 | 0605853N | Management, Technical & International Support | 06 | 135,102 | 86,932 | | 86,932 | U |
| 184 | 0605856N | Strategic Technical Support | 06 | 3,909 | 4,231 | | 4,231 | U |
| 185 | 0605861N | RDT&E Science and Technology Management | 06 | 1,104 | 1,072 | | 1,072 | U |
| 186 | 0605863N | RDT&E Ship and Aircraft Support | 06 | 105,019 | 97,471 | | 97,471 | U |
| 187 | 0605864N | Test and Evaluation Support | 06 | 369,056 | 373,834 | | 373,834 | U |
| 188 | 0605865N | Operational Test and Evaluation Capability | 06 | 20,298 | 21,554 | | 21,554 | U |

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| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 173 | 0306250M | Cyber Operations Technology Development | 05 | 26,406 | | | | 26,406 | U |
| | | System Development & Demonstration | | 6,332,033 | | 1,122 | 1,122 | 6,333,155 | |
| 174 | 0604256N | Threat Simulator Development | 06 | 66,678 | | | | 66,678 | U |
| 175 | 0604258N | Target Systems Development | 06 | 12,027 | | | | 12,027 | U |
| 176 | 0604759N | Major T&E Investment | 06 | 85,348 | | | | 85,348 | U |
| 177 | 0605126N | Joint Theater Air and Missile Defense Organization | 06 | | | | | | U |
| 178 | 0605152N | Studies and Analysis Support - Navy | 06 | 3,908 | | | | 3,908 | U |
| 179 | 0605154N | Center for Naval Analyses | 06 | 47,669 | | | | 47,669 | U |
| 180 | 0605285N | Next Generation Fighter | 06 | 20,698 | | | | 20,698 | U |
| 181 | 0605502N | Small Business Innovative Research | 06 | | | | | | U |
| 182 | 0605804N | Technical Information Services | 06 | 988 | | | | 988 | U |
| 183 | 0605853N | Management, Technical & International Support | 06 | 102,401 | | | | 102,401 | U |
| 184 | 0605856N | Strategic Technical Support | 06 | 3,742 | | | | 3,742 | U |
| 185 | 0605861N | RDT&E Science and Technology Management | 06 | | | | | | U |
| 186 | 0605863N | RDT&E Ship and Aircraft Support | 06 | 93,872 | | | | 93,872 | U |
| 187 | 0605864N | Test and Evaluation Support | 06 | 394,020 | | | | 394,020 | U |
| 188 | 0605865N | Operational Test and Evaluation Capability | 06 | 25,145 | | | | 25,145 | U |

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| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 189 | 0605866N | Navy Space and Electronic Warfare (SEW) Support | 06 | 16,274 | 16,227 | | 16,227 | U |
| 190 | 0605867N | SEW Surveillance/Reconnaissance Support | 06 | | | | | U |
| 191 | 0605873M | Marine Corps Program Wide Support | 06 | 21,423 | 21,538 | | 21,538 | U |
| 192 | 0605898N | Management HQ - R&D | 06 | 43,266 | 41,765 | | 41,765 | U |
| 193 | 0606355N | Warfare Innovation Management | 06 | 27,759 | 41,918 | | 41,918 | U |
| 194 | 0606942M | Assessments and Evaluations Cyber Vulnerabilities | 06 | | 7,000 | | 7,000 | U |
| 195 | 0606942N | Assessments and Evaluations Cyber Vulnerabilities | 06 | | 48,800 | | 48,800 | U |
| 196 | 0305327N | Insider Threat | 06 | | 1,682 | | 1,682 | U |
| 197 | 0902498N | Management Headquarters (Departmental Support Activities) | 06 | 1,749 | 1,579 | | 1,579 | U |
| 198 | 0909999N | Financing for Cancelled Account Adjustments | 06 | 71 | | | | U |
| 199 | 1206867N | SEW Surveillance/Reconnaissance Support | 06 | 9,408 | 8,684 | | 8,684 | U |
| | | Management Support | | 1,388,936 | 1,023,070 | | 1,023,070 | |
| 201 | 0604014N | F/A -18 Infrared Search and Track (IRST) | 07 | 68,087 | | | | U |
| 202 | 0604227N | HARPOON Modifications | 07 | | 5,197 | | 5,197 | U |
| 203 | 0604840M | F-35 C2D2 | 07 | | 234,107 | | 234,107 | U |
| 204 | 0604840N | F-35 C2D2 | 07 | | 227,998 | | 227,998 | U |

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|---|---|---|---|---|---|---|---|---|---|
| 189 | 0605866N | Navy Space and Electronic Warfare (SEW) Support | 06 | 15,773 | | | | 15,773 | U |
| 190 | 0605867N | SEW Surveillance/Reconnaissance Support | 06 | 8,402 | | | | 8,402 | U |
| 191 | 0605873M | Marine Corps Program Wide Support | 06 | 37,265 | | | | 37,265 | U |
| 192 | 0605898N | Management HQ - R&D | 06 | 39,673 | | | | 39,673 | U |
| 193 | 0606355N | Warfare Innovation Management | 06 | 28,750 | | | | 28,750 | U |
| 194 | 0606942M | Assessments and Evaluations Cyber Vulnerabilities | 06 | | | | | | U |
| 195 | 0606942N | Assessments and Evaluations Cyber Vulnerabilities | 06 | | | | | | U |
| 196 | 0305327N | Insider Threat | 06 | 2,645 | | | | 2,645 | U |
| 197 | 0902498N | Management Headquarters (Departmental Support Activities) | 06 | 1,460 | | | | 1,460 | U |
| 198 | 0909999N | Financing for Cancelled Account Adjustments | 06 | | | | | | U |
| 199 | 1206867N | SEW Surveillance/Reconnaissance Support | 06 | | | | | | U |
| | | Management Support | | 990,464 | | | | 990,464 | |
| 201 | 0604014N | F/A -18 Infrared Search and Track (IRST) | 07 | | | | | | U |
| 202 | 0604227N | HARPOON Modifications | 07 | 2,302 | | | | 2,302 | U |
| 203 | 0604840M | F-35 C2D2 | 07 | 422,881 | | | | 422,881 | U |
| 204 | 0604840N | F-35 C2D2 | 07 | 383,741 | | | | 383,741 | U |

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|---|---|---|---|---|---|---|---|---|
| 205 | 0607658N | Cooperative Engagement Capability (CEC) | 07 | 88,088 | 128,815 | | 128,815 | U |
| 206 | 0607700N | Deployable Joint Command and Control | 07 | 3,093 | 3,127 | | 3,127 | U |
| 207 | 0101221N | Strategic Sub & Weapons System Support | 07 | 130,652 | 148,379 | | 148,379 | U |
| 208 | 0101224N | SSBN Security Technology Program | 07 | 35,105 | 41,959 | | 41,959 | U |
| 209 | 0101226N | Submarine Acoustic Warfare Development | 07 | 9,439 | 11,311 | | 11,311 | U |
| 210 | 0101402N | Navy Strategic Communications | 07 | 17,624 | 38,661 | | 38,661 | U |
| 211 | 0204136N | F/A-18 Squadrons | 07 | 133,544 | 204,886 | | 204,886 | U |
| 212 | 0204163N | Fleet Telecommunications (Tactical) | 07 | 8,465 | 1,344 | | 1,344 | U |
| 213 | 0204228N | Surface Support | 07 | 20,587 | 9,708 | | 9,708 | U |
| 214 | 0204229N | Tomahawk and Tomahawk Mission Planning Center (TMPC) | 07 | 100,011 | 252,395 | | 252,395 | U |
| 215 | 0204311N | Integrated Surveillance System | 07 | 55,164 | 71,959 | | 71,959 | U |
| 216 | 0204313N | Ship-Towed Array Surveillance Systems | 07 | | 15,454 | | 15,454 | U |
| 217 | 0204413N | Amphibious Tactical Support Units (Displacement Craft) | 07 | 2,346 | 6,073 | | 6,073 | U |
| 218 | 0204460M | Ground/Air Task Oriented Radar (G/ATOR) | 07 | 53,605 | 44,579 | | 44,579 | U |
| 219 | 0204571N | Consolidated Training Systems Development | 07 | 64,585 | 104,903 | | 104,903 | U |
| 220 | 0204574N | Cryptologic Direct Support | 07 | 2,355 | 4,544 | | 4,544 | U |

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|---|---|---|---|---|---|---|---|---|---|
| 205 | 0607658N | Cooperative Engagement Capability (CEC) | 07 | 127,924 | | | | 127,924 | U |
| 206 | 0607700N | Deployable Joint Command and Control | 07 | | | | | | U |
| 207 | 0101221N | Strategic Sub & Weapons System Support | 07 | 157,676 | | | | 157,676 | U |
| 208 | 0101224N | SSBN Security Technology Program | 07 | 43,354 | | | | 43,354 | U |
| 209 | 0101226N | Submarine Acoustic Warfare Development | 07 | 6,815 | | | | 6,815 | U |
| 210 | 0101402N | Navy Strategic Communications | 07 | 31,174 | | | | 31,174 | U |
| 211 | 0204136N | F/A-18 Squadrons | 07 | 213,715 | | | | 213,715 | U |
| 212 | 0204163N | Fleet Telecommunications (Tactical) | 07 | | | | | | U |
| 213 | 0204228N | Surface Support | 07 | 36,389 | | | | 36,389 | U |
| 214 | 0204229N | Tomahawk and Tomahawk Mission Planning Center (TMPC) | 07 | 320,134 | | | | 320,134 | U |
| 215 | 0204311N | Integrated Surveillance System | 07 | 88,382 | | | | 88,382 | U |
| 216 | 0204313N | Ship-Towed Array Surveillance Systems | 07 | 14,449 | | | | 14,449 | U |
| 217 | 0204413N | Amphibious Tactical Support Units (Displacement Craft) | 07 | 6,931 | | | | 6,931 | U |
| 218 | 0204460M | Ground/Air Task Oriented Radar (G/ATOR) | 07 | 23,891 | | | | 23,891 | U |
| 219 | 0204571N | Consolidated Training Systems Development | 07 | 129,873 | | | | 129,873 | U |
| 220 | 0204574N | Cryptologic Direct Support | 07 | | | | | | U |

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|---|---|---|---|---|---|---|---|---|
| 221 | 0204575N | Electronic Warfare (EW) Readiness Support | 07 | 49,094 | 66,889 | | 66,889 | U |
| 222 | 0205601N | HARM Improvement | 07 | 70,415 | 120,762 | | 120,762 | U |
| 223 | 0205604N | Tactical Data Links | 07 | 75,523 | 88,979 | | 88,979 | U |
| 224 | 0205620N | Surface ASW Combat System Integration | 07 | 28,410 | 26,321 | | 26,321 | U |
| 225 | 0205632N | MK-48 ADCAP | 07 | 48,740 | 68,255 | | 68,255 | U |
| 226 | 0205633N | Aviation Improvements | 07 | 120,940 | 134,823 | | 134,823 | U |
| 227 | 0205675N | Operational Nuclear Power Systems | 07 | 127,445 | 117,028 | | 117,028 | U |
| 228 | 0206313M | Marine Corps Communications Systems | 07 | 170,529 | 172,683 | 16,130 | 188,813 | U |
| 229 | 0206335M | Common Aviation Command and Control System (CAC2S) | 07 | 6,976 | 4,760 | | 4,760 | U |
| 230 | 0206623M | Marine Corps Ground Combat/ Supporting Arms Systems | 07 | 68,941 | 100,850 | | 100,850 | U |
| 231 | 0206624M | Marine Corps Combat Services Support | 07 | 24,915 | 29,905 | | 29,905 | U |
| 232 | 0206625M | USMC Intelligence/Electronic Warfare Systems (MIP) | 07 | 30,630 | 37,821 | | 37,821 | U |
| 233 | 0206629M | Amphibious Assault Vehicle | 07 | 53,404 | 20,690 | | 20,690 | U |
| 234 | 0207161N | Tactical AIM Missiles | 07 | 34,063 | 40,121 | | 40,121 | U |
| 235 | 0207163N | Advanced Medium Range Air-to-Air Missile (AMRAAM) | 07 | 29,486 | 28,235 | | 28,235 | U |
| 239 | 0303109N | Satellite Communications (SPACE) | 07 | | | | | U |
| 240 | 0303138N | Consolidated Afloat Network Enterprise Services (CANES) | 07 | 24,197 | 23,697 | | 23,697 | U |

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|---|---|---|---|---|---|---|---|---|---|
| 221 | 0204575N | Electronic Warfare (EW) Readiness Support | 07 | 82,325 | | | | 82,325 | U |
| 222 | 0205601N | HARM Improvement | 07 | 138,431 | | | | 138,431 | U |
| 223 | 0205604N | Tactical Data Links | 07 | | | | | | U |
| 224 | 0205620N | Surface ASW Combat System Integration | 07 | 29,572 | | | | 29,572 | U |
| 225 | 0205632N | MK-48 ADCAP | 07 | 85,973 | | | | 85,973 | U |
| 226 | 0205633N | Aviation Improvements | 07 | 125,461 | | | | 125,461 | U |
| 227 | 0205675N | Operational Nuclear Power Systems | 07 | 106,192 | | | | 106,192 | U |
| 228 | 0206313M | Marine Corps Communications Systems | 07 | 143,317 | | 15,000 | 15,000 | 158,317 | U |
| 229 | 0206335M | Common Aviation Command and Control System (CAC2S) | 07 | 4,489 | | | | 4,489 | U |
| 230 | 0206623M | Marine Corps Ground Combat/ Supporting Arms Systems | 07 | 51,788 | | | | 51,788 | U |
| 231 | 0206624M | Marine Corps Combat Services Support | 07 | 37,761 | | | | 37,761 | U |
| 232 | 0206625M | USMC Intelligence/Electronic Warfare Systems (MIP) | 07 | 21,458 | | | | 21,458 | U |
| 233 | 0206629M | Amphibious Assault Vehicle | 07 | 5,476 | | | | 5,476 | U |
| 234 | 0207161N | Tactical AIM Missiles | 07 | 19,488 | | | | 19,488 | U |
| 235 | 0207163N | Advanced Medium Range Air-to-Air Missile (AMRAAM) | 07 | 39,029 | | | | 39,029 | U |
| 239 | 0303109N | Satellite Communications (SPACE) | 07 | 34,344 | | | | 34,344 | U |
| 240 | 0303138N | Consolidated Afloat Network Enterprise Services (CANES) | 07 | 22,873 | | | | 22,873 | U |

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|---|---|---|---|---|---|---|---|---|
| 241 | 0303140N | Information Systems Security Program | 07 | 49,310 | 44,228 | | 44,228 | U |
| 243 | 0305192N | Military Intelligence Program (MIP) Activities | 07 | 6,934 | 6,081 | | 6,081 | U |
| 244 | 0305204N | Tactical Unmanned Aerial Vehicles | 07 | 7,770 | 8,529 | | 8,529 | U |
| 245 | 0305205N | UAS Integration and Interoperability | 07 | 20,848 | 24,663 | | 24,663 | U |
| 246 | 0305208M | Distributed Common Ground/Surface Systems | 07 | 13,338 | 7,610 | | 7,610 | U |
| 247 | 0305208N | Distributed Common Ground/Surface Systems | 07 | 40,150 | 42,846 | | 42,846 | U |
| 248 | 0305220N | MQ-4C Triton | 07 | 94,115 | 14,395 | | 14,395 | U |
| 249 | 0305231N | MQ-8 UAV | 07 | 62,656 | 24,143 | | 24,143 | U |
| 250 | 0305232M | RQ-11 UAV | 07 | 2,002 | 524 | | 524 | U |
| 251 | 0305234N | Small (Level 0) Tactical UAS (STUASL0) | 07 | 4,827 | 5,265 | | 5,265 | U |
| 252 | 0305239M | RQ-21A | 07 | 10,500 | 6,000 | | 6,000 | U |
| 253 | 0305241N | Multi-Intelligence Sensor Development | 07 | 93,020 | 81,231 | | 81,231 | U |
| 254 | 0305242M | Unmanned Aerial Systems (UAS) Payloads (MIP) | 07 | 18,392 | 5,956 | | 5,956 | U |
| 255 | 0305421N | RQ-4 Modernization | 07 | 224,249 | 219,403 | | 219,403 | U |
| 256 | 0308601N | Modeling and Simulation Support | 07 | 5,038 | 7,097 | | 7,097 | U |
| 257 | 0702207N | Depot Maintenance (Non-IF) | 07 | 35,463 | 46,560 | | 46,560 | U |
| 258 | 0708730N | Maritime Technology (MARITECH) | 07 | 4,621 | 27,284 | | 27,284 | U |

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|---|---|---|---|---|---|---|---|---|---|
| 241 | 0303140N | Information Systems Security Program | 07 | 41,853 | | | | 41,853 | U |
| 243 | 0305192N | Military Intelligence Program (MIP) Activities | 07 | 8,913 | | | | 8,913 | U |
| 244 | 0305204N | Tactical Unmanned Aerial Vehicles | 07 | 9,451 | | | | 9,451 | U |
| 245 | 0305205N | UAS Integration and Interoperability | 07 | 42,315 | | | | 42,315 | U |
| 246 | 0305208M | Distributed Common Ground/Surface Systems | 07 | 22,042 | | | | 22,042 | U |
| 247 | 0305208N | Distributed Common Ground/Surface Systems | 07 | | | | | | U |
| 248 | 0305220N | MQ-4C Triton | 07 | 11,784 | | | | 11,784 | U |
| 249 | 0305231N | MQ-8 UAV | 07 | 29,618 | | | | 29,618 | U |
| 250 | 0305232M | RQ-11 UAV | 07 | 509 | | | | 509 | U |
| 251 | 0305234N | Small (Level 0) Tactical UAS (STUASL0) | 07 | 11,545 | | | | 11,545 | U |
| 252 | 0305239M | RQ-21A | 07 | 10,914 | | | | 10,914 | U |
| 253 | 0305241N | Multi-Intelligence Sensor Development | 07 | 70,612 | | | | 70,612 | U |
| 254 | 0305242M | Unmanned Aerial Systems (UAS) Payloads (MIP) | 07 | 3,704 | | | | 3,704 | U |
| 255 | 0305421N | RQ-4 Modernization | 07 | 202,346 | | | | 202,346 | U |
| 256 | 0308601N | Modeling and Simulation Support | 07 | 7,119 | | | | 7,119 | U |
| 257 | 0702207N | Depot Maintenance (Non-IF) | 07 | 38,182 | | | | 38,182 | U |
| 258 | 0708730N | Maritime Technology (MARITECH) | 07 | 6,779 | | | | 6,779 | U |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | Sec |
|---|---|---|---|---|---|---|---|---|
| 259 | 1203109N | Satellite Communications (SPACE) | 07 | 40,330 | 34,174 | | 34,174 | U |
| 9999 | 9999999999 | Classified Programs | | 1,857,702 | 1,670,503 | 117,282 | 1,787,785 | U |
| | | Operational Systems Development | | 4,347,723 | 4,913,710 | 133,412 | 5,047,122 | |
| Total Research, Development, Test & Eval, Navy | | | | 18,465,332 | 18,490,002 | 167,812 | 18,657,814 | |

Department of the Navy
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Appropriation: 1319N Research, Development, Test & Eval, Navy

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Sec |
|---|---|---|---|---|---|---|---|---|---|
| 259 | 1203109N | Satellite Communications (SPACE) | 07 | 15,868 | | | | 15,868 | U |
| 9999 | 9999999999 | Classified Programs | | 1,613,137 | | 108,282 | 108,282 | 1,721,419 | U |
| | | Operational Systems Development | | 5,104,299 | | 123,282 | 123,282 | 5,227,581 | |
| Total Research, Development, Test & Eval, Navy | | | | 20,270,499 | | 164,410 | 164,410 | 20,434,909 | |

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| 2 | 01 | 0601152N | In-House Lab Independent Res | Volume 1 - 11 |
| 3 | 01 | 0601153N | Defense Research Sciences | Volume 1 - 17 |


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| 5 | 02 | 0602123N | Force Protection Applied Res | Volume 1 - 83 |
| 6 | 02 | 0602131M | Marine Corps Lndg Force Tech | Volume 1 - 105 |
| 7 | 02 | 0602235N | Common Picture Applied Research | Volume 1 - 123 |
| 8 | 02 | 0602236N | Warfighter Sustainment Applied Res | Volume 1 - 137 |
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| 10 | 02 | 0602435N | Ocean Wrfghtg Env Applied Res | Volume 1 - 173 |

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| 11 | 02 | 0602651M | JT Non-Lethal Wpns Applied Res | Volume 1 - 193 |
| 12 | 02 | 0602747N | Undersea Warfare Applied Res | Volume 1 - 197 |
| 13 | 02 | 0602750N | (U)Future Naval Capabilities Applied Research | Volume 1 - 211 |
| 14 | 02 | 0602782N | Mine & Exp Warfare Applied Res | Volume 1 - 225 |
| 15 | 02 | 0602792N | (U)Innovative Naval Prototypes(INP) Applied Res | Volume 1 - 237 |
| 16 | 02 | 0602861N | (U)Science & Tech Management - ONR Field Acts | Volume 1 - 253 |


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| 18 | 03 | 0603271N | Electromagnetic Systems Advanced Technology | Volume 1 - 267 |
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| 21 | 03 | 0603673N | (U)Future Naval Capabilities Advanced Tech Dev | Volume 1 - 309 |
| 22 | 03 | 0603680N | (U)Manufacturing Technology Program | Volume 1 - 325 |
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| 26 | 03 | 0603782N | Mine and Expeditionary Warfare Advanced Technology | Volume 1 - 353 |
| 27 | 03 | 0603801N | (U) Innovative Naval Prototypes (INP) Adv Tech Dev | Volume 1 - 361 |


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| 31 | 04 | 0603254N | ASW Systems Development | Volume 2 - 131 |
| 32 | 04 | 0603261N | Tactical Airborne Reconnaissance | Volume 2 - 139 |
| 33 | 04 | 0603382N | Advanced Combat Systems Tech | Volume 2 - 147 |
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| 55 | 04 | 0603609N | Conventional Munitions | Volume 2 - 691 |
| 56 | 04 | 0603635M | Marine Corps Grnd Cmbt/Supt Sys | Volume 2 - 709 |
| 57 | 04 | 0603654N | JT Service Explosive Ordn Dev | Volume 2 - 735 |
| 58 | 04 | 0603713N | Ocean Engineering Tech Dev | Volume 2 - 781 |
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| 69 | 04 | 0603795N | Land Attack Tech | Volume 2 - 955 |
| 70 | 04 | 0603851M | Joint Non-Lethal Weapons Testing | Volume 2 - 979 |
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| 74 | 04 | 0604027N | (U)Digital Warfare | Volume 2 - 1053 |
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| 77 | 04 | 0604030N | (U)Rapid Prototyping, Experimentation and Dem | Volume 2 - 1129 |
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| 79 | 04 | 0604112N | (U)Gerald R Ford Cl Nuc Aircraft Carrier CVN 78-80 | Volume 2 - 1153 |
| 80 | 04 | 0604126N | (U)Littoral Airborne MCM | Volume 2 - 1179 |
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| 85 | 04 | 0604320M | (U)Rapid Technology Capability Prototype | Volume 2 - 1261 |
| 86 | 04 | 0604454N | (U)LX(R) | Volume 2 - 1281 |
| 87 | 04 | 0604536N | (U)Advanced Undersea Prototyping | Volume 2 - 1289 |
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| 92 | 04 | 0303354N | ASW Systems Development - MIP | Volume 2 - 1417 |
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| 102 | 05 | 0604218N | Air/Ocean Equipment Engineering | Volume 3 - 97 |
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| 104 | 05 | 0604230N | Warfare Support System | Volume 3 - 131 |
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| 142 | 05 | 0604727N | Joint Standoff Weapon Systems | Volume 3 - 1191 |
| 143 | 05 | 0604755N | Ship Self Def (Detect & Cntrl) | Volume 3 - 1201 |
| 144 | 05 | 0604756N | Ship Self Def (Engage: Hard Kill) | Volume 3 - 1259 |
| 145 | 05 | 0604757N | Ship Self Def (Engage: Soft Kill/EW) | Volume 3 - 1307 |
| 146 | 05 | 0604761N | Intelligence Engineering | Volume 3 - 1347 |
| 147 | 05 | 0604771N | Medical Development | Volume 3 - 1365 |

***Appropriation 1319: Research, Development, Test & Evaluation, Navy***


| Line # | Budget Activity | Program Element Number | Program Element Title | Page |
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| 149 | 05 | 0604800M | (U)Joint Strike Fighter (JSF) - EMD | Volume 3 - 1431 |
| 150 | 05 | 0604800N | JT Strike Fighter (JSF) - EMD | Volume 3 - 1459 |
| 151 | 05 | 0604810M | (U)Joint Strike Fighter Follow On Mod (FoM) - MC | Volume 3 - 1487 |
| 152 | 05 | 0604810N | (U)Joint Strike Fighter Follow On Mod (FoM) - Navy | Volume 3 - 1501 |
| 153 | 05 | 0605013M | Marine Corps IT Dev/Mod | Volume 3 - 1515 |
| 154 | 05 | 0605013N | Information Technology Development | Volume 3 - 1533 |
| 155 | 05 | 0605024N | (U)Anti-Tamper Technology Support | Volume 3 - 1713 |
| 156 | 05 | 0605212M | CH-53K | Volume 3 - 1725 |
| 157 | 05 | 0605212N | CH-53K | Volume 3 - 1745 |
| 158 | 05 | 0605215N | (U)Mission Planning | Volume 3 - 1755 |
| 159 | 05 | 0605217N | (U)Common Avionics | Volume 3 - 1791 |
| 160 | 05 | 0605220N | (U)Ship to Shore Connector (SSC) | Volume 3 - 1819 |
| 161 | 05 | 0605327N | (U)T-AO 205 Class | Volume 3 - 1837 |
| 162 | 05 | 0605414N | (U) Unmanned Carrier Aviation (UCA) | Volume 3 - 1843 |
| 163 | 05 | 0605450M | Joint Air-to-ground Missile (JAGM) | Volume 3 - 1867 |
| 164 | 05 | 0605450N | Joint Air-to-ground Missile (JAGM) | Volume 3 - 1883 |
| 165 | 05 | 0605500N | Multi-mssn Maritime Aircraft (MMA) (P-8A) | Volume 3 - 1893 |

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| 167 | 05 | 0605611M | (U) MC AVS Development & Demonstration | Volume 3 - 1925 |
| 168 | 05 | 0605813M | (U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem | Volume 3 - 1945 |
| 169 | 05 | 0204202N | DDG-1000 | Volume 3 - 1955 |
| 172 | 05 | 0304785N | Tactical Cryptologic Systems | Volume 3 - 1965 |
| 173 | 05 | 0306250M | (U)Cyber Operations Technology Development | Volume 3 - 2017 |

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| (U)Joint Strike Fighter (JSF) - EMD | 0604800M | 149 | 05 | Volume 3 - 1431 |
| (U)Joint Strike Fighter Follow On Mod (FoM) - MC | 0604810M | 151 | 05 | Volume 3 - 1487 |
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| (U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST | 0604657M | 140 | 05 | Volume 3 - 1167 |
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| (U)Multi-Mission Maritime (MMA) Increment III | 0605504N | 166 | 05 | Volume 3 - 1911 |
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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0603208N *I Training System Aircraft* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 47.043 | 16.343 | 12.798 | 15.514 | - | 15.514 | 4.287 | 5.995 | 5.959 | 3.526 | 0.000 | 111.465 |
| 3367: *Training Aircraft Updates* | 47.043 | 14.798 | 12.798 | 15.514 | - | 15.514 | 4.287 | 5.995 | 5.959 | 3.526 | 0.000 | 109.920 |
| 9999: *Congressional Adds* | 0.000 | 1.545 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.545 |

**A. Mission Description and Budget Item Justification**

This program element provides for design, development, integration and test of various pre-production platform improvements for Naval Undergraduate Flight Training Systems which include T-45, T-6, TH-57, T-44, Advanced Helicopter Training System, and Multi-Engine Advanced Trainer aircraft. Continued development engineering for improvements in reliability, maintainability, safety and meeting Federal Aviation Administration (FAA) Next Generation Air Transportation System (NextGen) flight safety requirements are required to ensure maximum benefit is achieved to provide effective cost of ownership and availability of aircraft to meet Chief of Naval Air Training (CNATRA) student training requirements. Specific efforts include: TH-57 Follow-On Training System; T-45, T-6, TH-57 and T-44 Training System Improvements, and T-45 and T-6 Physiological Episode (PE) mitigation analysis.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 16.945 | 12.798 | 15.722 | - | 15.722 |
| Current President's Budget | 16.343 | 12.798 | 15.514 | - | 15.514 |
| Total Adjustments | -0.602 | 0.000 | -0.208 | - | -0.208 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.566 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.210 | - | -0.210 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.002 | - | 0.002 |
| • Congressional Directed Reductions Adjustments | -1.636 | - | - | - | - |
| • Congressional Add Adjustments | 1.600 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0603208N *I Training System Aircraft* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *T-45 and F/A-18 Physiological Episodes* | 1.545 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 1.545 | 0.000 |
| Congressional Add Totals for all Projects | 1.545 | 0.000 |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $0.210 million to account for the availability of prior year execution balances.

Technical:
TH-57 Follow-On Training System funding is increased in support of Advanced Helicopter Training System (AHTS) program start and award of TH-XX contract.

T-45 Required Avionics Sustainment program (RASP) FY2020 funding request was reduced due to RASP program transitioning efforts to retrofit ADS-B Out capability into aircraft.

Training System Improvements funding for T-6 Crash Survivable Cockpit Voice Recorder (CSCVR), T-6 Controlled Flight Into Terrain (CFIT) Avoidance, T-45 Digital Inline Timer development, T-45 Next Generation Strike Aircraft Analysis of Alternatives(AoA) and T-44 Fatigue Life Extension Study.

T-6B Flight Management System removed from budget to reflect program cancellation (FY19-FY20).

Schedule:

T-6B Flight Management System schedule removed from budget to reflect program cancellation (FY19-FY20).

T-6 Joint Study Efforts extended from 4Q20 to 4Q21 in support of continued studies with the Joint Primary Aircraft Training System (JPATS) program office.

Naval Aviation Physiological Episode schedule was changed to reflect program execution based on dynamic requirements. Changes included the removal of T-45 Physiological Episode Root Cause Analytic Project, Real-Time Air Quality Test Sensor Study extended to 4Q21 due to ongoing Physiological Episode mitigation studies, as well as adding T-6B PE support.

Training System Improvement schedule was changed to include T-6 CSCVR, T-6 CFIT Avoidance, T-45 Digital Inline Timer development, T-45 Next Generation Strike Aircraft (AoA) and T-44 Fatigue Life Extension Study.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0603208N *I Training System Aircraft* |

T-45 RASP Test asset deliveries delayed from 4Q18 to 3Q19 due to delays from contractor.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0603208N / *Training System Aircraft* | Project (Number/Name)<br>3367 / *Training Aircraft Updates* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3367: *Training Aircraft Updates* | 47.043 | 14.798 | 12.798 | 15.514 | - | 15.514 | 4.287 | 5.995 | 5.959 | 3.526 | 0.000 | 109.920 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The TH-57 Follow-On Training System:

The TH-57 Training System consists of TH-57B aircraft, TH-57C aircraft, and associated family of ground based training devices. The TH-57 Training System is experiencing obsolescence, diminishing manufacturing sources and material shortages, training capability gaps (as identified in the Capabilities based assessment Naval Aviation Undergraduate Flight Training), and increasingly expensive operating costs related to aging aircraft issues. This research and development effort will investigate alternatives for replacing the TH-57 training system and develop and validate the acquisition strategy for future procurement of the capability to continue to provide the fleet replacement squadrons with qualified and capable rotary-wing naval aviators. This effort includes, but is not limited to, market research, requirements development, evaluation of acquisition strategies, evaluation of proposals, and testing of prototypes.

Training System Improvements:

Efforts will provide for studies and analysis, design, development, integration and test of pre-production platform improvements for Naval Undergraduate Flight Training Systems, which will conduct engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decisions.

T-45 and T-6 Physiological Episode (PE) Mitigation:

Efforts will provide for studies and development efforts to address mitigation of the T-45 and T-6 physiological episodes.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** TH-57 Follow-On Training System | 2.145 | 2.431 | 2.300 | 0.000 | 2.300 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding supports development of alternatives for replacing the TH-57 training system and development and validation of the acquisition strategy for future procurement of the capability to continue to provide the fleet replacement squadrons with qualified and capable rotary-wing Naval Aviators. This effort includes, but is not limited to, market research, requirements development, evaluation of acquisition strategies, evaluation of proposals, and testing of prototypes. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue AHTS requirements development, evaluation of acquisition strategies, and evaluation of proposals. As well as release RFPs for helicopters and ground based training systems (GBTS). Conduct source selection and prepare for contract award and Milestone C/Full Rate Production (FRP). Begin drafting RFP for Contractor Logistics Support (CLS).<br>***FY 2020 Base Plans:***<br>Complete evaluation of proposals, continue curriculum development, receive Milestone C/Full Rate Production decision and award TH-XX contract.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY2020 funding request was decreased by $0.131M due to award of TH-XX contract and transitioning efforts to production. | | | | | |
| ***Title:*** Training System Improvements | 0.122 | 0.154 | 7.059 | 0.000 | 7.059 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding provides for design, development, integration and test of platform improvements for Naval Undergraduate Flight Training Systems, which include T-45 Training System (TS), Joint Primary Aircraft Training System (T-6), TH-57 and T-44 aircraft.<br>***FY 2019 Plans:***<br>Continue studies & development efforts for platform improvements for Naval Undergraduate Flight Training Systems, including the system safety improvements to the T-6 for Crash Survivable Cockpit Voice Recorder (CSCVR) and Controlled Flight Into Terrain (CFIT) Avoidance.<br>***FY 2020 Base Plans:***<br>Continue studies & development efforts for platform improvements for Naval Undergraduate Flight Training Systems, including the system safety improvements to the T-6 for Crash Survivable Cockpit Voice Recorder (CSCVR) and Controlled Flight Into Terrain (CFIT) Avoidance, T-45 Digital Inline Timer development, T-45 Next Generation Strike Training Aircraft Analysis of Alternatives (AoA) and T-44 Fatigue Life Extension Study.<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY2020 funding request was increased by $6.905M to support T-6 CSCVR and CFIT Validation and Verification for T-6 as well as the T-45 Digital Inline Timer development and T-45 Next Generation Strike Training Aircraft (AoA). | | | | | |
| ***Title:*** Naval Aviation Physiological Episode<br>***Articles:***<br><br>***Description:*** Funding provides for design, development, integration and test of platform improvements for Naval Undergraduate Flight Training Systems to include Naval Aviation Physiological Episode (PE) Mitigation in the Training Aircrafts (T-45 and T-6).<br><br>***FY 2019 Plans:***<br>Continue studies & development efforts for platform improvements for Naval Undergraduate Flight Training Systems, including T-45 Physiological Episode mitigation, and joint efforts with Air Force for Joint Primary Aircraft Training System (T-6).<br><br>***FY 2020 Base Plans:***<br>Continue studies & development efforts as well as utilize associative learning 'artificial intelligence' platform to evaluate aircraft and maintenance data in support of PE root cause investigations for platform improvements for Naval Undergraduate Flight Training Systems, including T-45 Physiological Episode mitigation, and joint efforts with Air Force for Joint Primary Aircraft Training System (T-6).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY2020 funding request was increased by $0.055M to support the incorporation of associative learning to platform improvements to the T-45 for Physiological Episode mitigation. | 3.363<br>- | 6.100<br>- | 6.155<br>- | 0.000<br>- | 6.155<br>- |
| ***Title:*** T45 Required Avionics Sustainment Program (RASP)<br>***Articles:***<br><br>***Description:*** Funding supports development, integration, test, and certification of the Automatic Dependent Surveillance-Broadcast (ADS-B) Out capability in the T-45 Training System to comply with the January 1, 2020 Federal Aviation Administration ADS-B Out mandate. | 8.612<br>- | 4.113<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Test Readiness Review (TRR) is planned to complete Q2 FY 2019, Flight Readiness Review (FRR) is planned to complete in Q3 FY 2019 followed by the commencement of on-aircraft developmental test in support of certification in Q4 FY 2019.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY2020 funding request was decreased by $4.133M due to RASP program transitioning efforts to retrofit ADS-B Out capability into aircraft. | | | | | |
| ***Title:*** T6 A/B Communication and Navigation System/Air Traffic Management (CNS/ATM)<br>***Articles:***<br>***Description:*** Funding supports development, integration, test, and certification of the Automatic Dependent Surveillance-Broadcast (ADS-B) Out capability in the T-6 A/B Training System to comply with the January 1, 2020 Federal Aviation Administration ADS-B Out mandate.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 0.556<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 14.798 | 12.798 | 15.514 | 0.000 | 15.514 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0569: *T45 Series* | 164.191 | 193.567 | 186.022 | - | 186.022 | 166.948 | 182.495 | 180.897 | 185.160 | 545.852 | 2,709.308 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0571: *JT Primary Acft Trnr Sys (JPATS)* | 24.907 | 26.470 | 21.824 | - | 21.824 | 28.367 | 31.242 | 31.422 | 32.163 | 19.909 | 253.452 |
| • APN/0549: *Trainer Acft Series* | 8.101 | 11.660 | 5.616 | - | 5.616 | 24.973 | 26.223 | 26.916 | 27.589 | 0.000 | 366.980 |
| • APN/0344: *Advnaced Helicopter Trainer System* | 0.000 | 0.000 | 261.160 | - | 261.160 | 266.000 | 263.500 | 130.500 | 0.000 | 182.145 | 1,103.305 |

**Remarks**

**D. Acquisition Strategy**

T-45 Training System: Required Avionics Sustainment Program (RASP) Phase I is the first phase to equip the T-45 to operate in the Federal Aviation Administration's (FAA) Next Generation Air Transportation System (NextGen) airspace through the expected life of the T-45. The Research Development Test and Evaluation effort consists of a sole source Technology Maturation and Risk Reduction/ Engineering Manufacturing Development contract effort that awarded in FY 2016. Replacement kits for the Weapon Replaceable Assemblies (WRA) associated with the Automatic Dependent Surveillance-Broadcast (ADS-B) Out capability will be contracted through the Lead Systems Integrator for the Engineering Manufacturing Development phase through Test and Validation/Verification.

T6 Communication, Navigation, System/Air Traffic Management (CNS/ATM) and Avionics Upgrades for FAA Compliance are outside of the Joint Primary Aircraft Training System (JPATS) Major Defense Acquisition Program (MDAP) and will be established as a new Joint Acquisition Program with the United States Air Force. For the JPATS Avionics Upgrade for FAA Compliance effort, a competitive award will be the strategy for the T-6A air vehicles due to their federated design. The Navy is the lead for T-6B acquisition efforts and a sole-source strategy will be sought for the T-6B air vehicles due to proprietary hardware and software. Avionics in the T-6B are of an integrated design with proprietary hardware and software controlling input and output of navigation, communications, air data and other avionics information through an Integrated Avionics Computer (IAC). The CNS/ATM mandate requires integration into these systems in order to meet FAA Advisory Circular 20-165A Automatic Dependent Surveillance-Broadcast (ADS-B) Out system requirements and user capability requirements for flying in national airspace by 2020. Specifically, transponder and Global Positioning System (GPS) information that the ADS-B functions rely on are processed through proprietary software written to integrate with proprietary hardware designed by the same avionics manufacturer. A sole-source approach has been selected because the government does not own or have access to proprietary data to support development of hardware or software required to integrate ADS-B into the aircraft. System Safety Improvement research, design and development will allow the T-6 to remain a viable aircraft for training the Fleet.

The TH-57 Follow-On Training System effort will be established to determine and implement the most cost efficient and effective path forward for providing Rotary Wing Naval Aviators to the Fleet Replacement Squadrons. The acquisition strategy includes three separate contract actions: 1) direct procurement of a new commercial off-the-shelf training helicopter and required spare parts, 2) a single Contract Logistics Services contract for AHTS and TH-57 sundown, and 3) contractor owned, contractor operated Ground Based Training Systems housed in Government facilities.

Training System Improvements: Efforts under this category are expected to be limited to those efforts meeting thresholds under the abbreviated acquisition category.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

**E. Performance Metrics**

T-45 Training System: Performance of the program will be measured via the Acquisition and Systems Engineering Technical Review (SETR) Process. Critical Design Review (CDR) is planned for 1st quarter FY 2018 with Flight Readiness Review (FRR) planned for 1st quarter FY 2019.

T-6 Joint Primary Aircraft Training System (JPATS): For T-6B National Airspace Compliance is an Abbreviated Acquisition Program with Acquisition Milestones utilizing systems engineering processes. Other system safety improvements will allow the T-6 to maintain Joint requirements.

TH-57 Follow-On Training System: The follow-on system to the TH-57 will be a new Major Defense Acquisition Program (MDAP) with Acquisition Milestones utilizing the systems engineering processes. The follow-on system to the TH-57 is being recommended for designation as a Middle-Tier, Pilot Rapid Acquisition Program entering post-Milestone C to Full Rate Production. Otherwise, the procurement will be a CAT II Acquisition.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0603208N / *Training System Aircraft* | Project (Number/Name)<br>3367 / *Training Aircraft Updates* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T45 Product Development Cost | SS/CPFF | Boeing : St. Louis, MO | 14.575 | 5.342 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.917 | 19.917 |
| T45 PE Product Development Cost | C/CPFF | Various : Various | 0.898 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.898 | 0.898 |
| Training System Improvement T6 CSCVR | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 3.000 | Feb 2020 | - | | 3.000 | 0.400 | 3.400 | 3.400 |
| Training System Improvement T6 CFIT | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 1.200 | Feb 2020 | - | | 1.200 | 1.200 | 2.400 | 2.400 |
| Training System Improvement T45 Digital Inline Timer | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 1.000 | Jan 2020 | - | | 1.000 | 1.200 | 2.200 | 2.200 |
| Training System Improvement T45 Next Gen Strike Training Aircraft AoA | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 1.545 | Dec 2019 | - | | 1.545 | 2.500 | 4.045 | 4.045 |
| Prior Year Product Development costs no longer in the FYDP | Various | Various : Various | 4.202 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.202 | 4.202 |
| | | **Subtotal** | 19.675 | 5.342 | | 0.000 | | 6.745 | | - | | 6.745 | 5.300 | 37.062 | N/A |

**Remarks**

Training System Improvements T6: FY2020 Development Costs support T-6 CSCVR Validation and Verification.
Training System Improvements T6: FY2020 Development Costs support T-6 CFIT Validation and Verification.
Training System Improvements T45: FY2020 Development Costs support T-45 Digital Inline Timer development efforts.
Training System Improvements T45: FY2020 Development Costs support T-45 Next Gen Strike Training Aircraft AoA.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T45 Systems Engineering Support - EMD | WR | NAWCAD : Patuxent River, MD | 6.020 | 0.705 | Nov 2017 | 0.865 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 7.590 | - |
| T45 Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 1.898 | 0.214 | Nov 2017 | 0.393 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.505 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0603208N / *Training System Aircraft* | Project (Number/Name)<br>3367 / *Training Aircraft Updates* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T45 Engineering Study | SS/BOA | JHU : Laurel, MD | 0.833 | 1.329 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.162 | 2.162 |
| T6 Systems Engineering Support | WR | NAWCAD : Patuxent River, MD | 1.849 | 0.367 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 2.400 | 4.616 | - |
| T6 Systems Engineering Support | WR | NADEP : Jacksonville, FL | 0.263 | 0.250 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.513 | - |
| TH-57 Follow-On Training System Engineering Support | WR | Various : Various | 0.000 | 2.116 | Nov 2017 | 2.431 | Nov 2018 | 2.300 | Nov 2019 | - | | 2.300 | 0.377 | 7.224 | - |
| T45 PE Support | WR | Various : Various | 1.250 | 0.500 | Aug 2018 | 3.250 | Aug 2019 | 2.450 | Aug 2020 | - | | 2.450 | 0.000 | 7.450 | - |
| T6 PE Support | WR | AFRL RH : Wright Patterson AFB, OH | 0.000 | 0.161 | Jun 2018 | 1.000 | Nov 2018 | 1.100 | Nov 2019 | - | | 1.100 | 0.000 | 2.261 | - |
| Training System Improvement T-6 Joint Study Efforts | MIPR | AFRL : Wright-Patterson AFB | 0.104 | 0.030 | Nov 2017 | 0.069 | Nov 2018 | 0.086 | Nov 2019 | - | | 0.086 | 3.200 | 3.489 | - |
| Training System Improvement T-45 Real-time Air Quality Sensor (RTAQS) Study | MIPR | AFRL RH : Wright Patterson AFB, OH | 0.328 | 0.557 | Jul 2018 | 0.500 | Jul 2019 | 0.550 | Jul 2020 | - | | 0.550 | 0.000 | 1.935 | - |
| Training System Improvement T-44 Fatigue Life Extension Study | WR | NADEP : Jacksonville, FL | 0.000 | 0.000 | | 0.000 | | 0.163 | Nov 2019 | - | | 0.163 | 5.000 | 5.163 | - |
| Prior Year Support costs no longer funded in FYDP | Various | Various : Various | 4.410 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.410 | - |
| | | **Subtotal** | 16.955 | 6.229 | | 8.508 | | 6.649 | | - | | 6.649 | 10.977 | 49.318 | N/A |

**Remarks**

T45 and T-6 PE Support: Cost category added for T-45 and T-6 Physiological Episodes (PE) support
TH-57 Follow-On Training System Engineering Support: Cost category added for Advanced Helicopter Systems Engineering Support.
Training System Improvement: Cost category added for T-44 Fatigue Life Extension Study.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0603208N / *Training System Aircraft* | Project (Number/Name)<br>3367 / *Training Aircraft Updates* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T45 Test & Certification | WR | NAWCAD : Patuxent River, MD | 2.218 | 0.600 | Nov 2017 | 0.845 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 3.663 | - |
| T6 Test and Evaluation | C/CPFF | Textron Aircraft Defense : Wichita, KS | 0.177 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.177 | 0.177 |
| | | **Subtotal** | 2.395 | 0.600 | | 0.845 | | 0.000 | | - | | 0.000 | 0.000 | 3.840 | N/A |

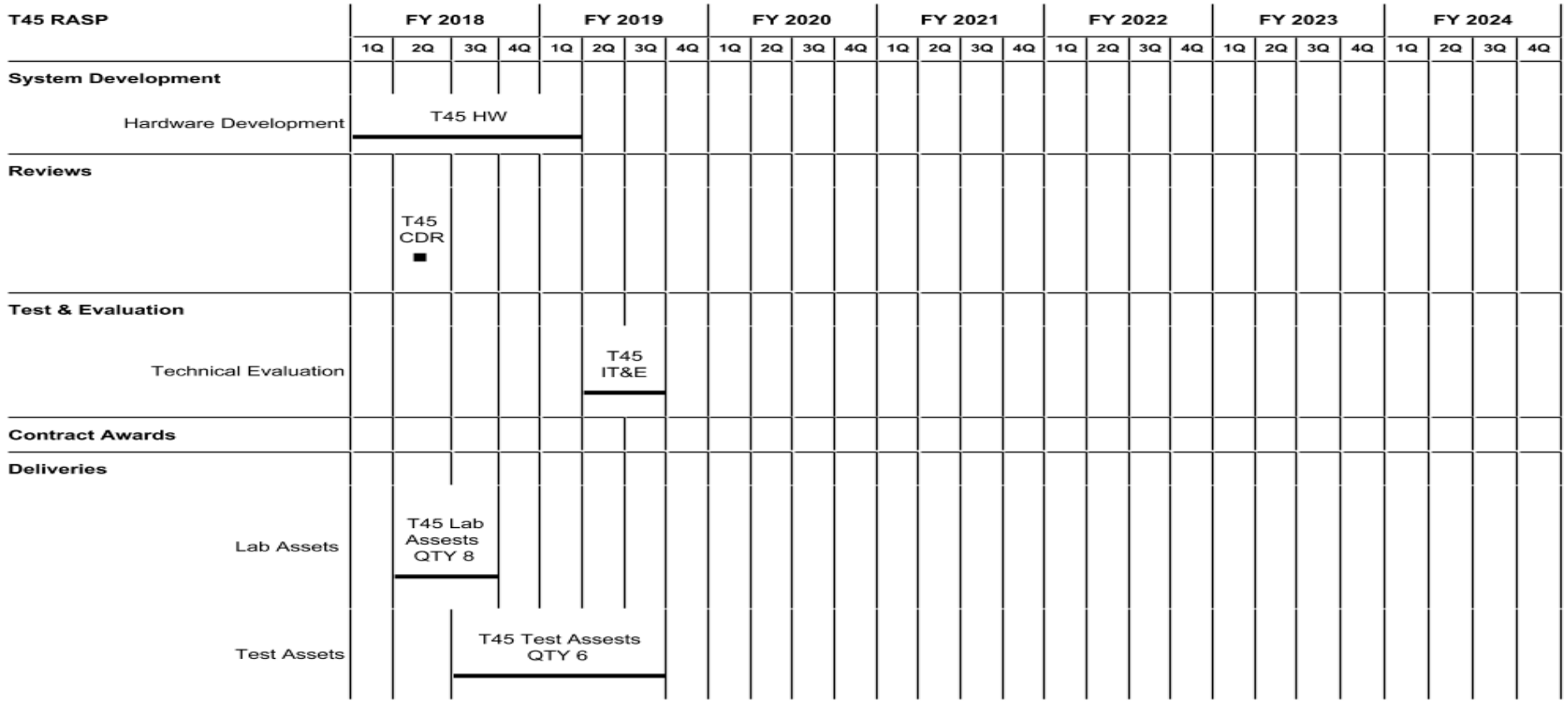
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T45 Project Management | Various | Various : Various | 1.557 | 0.759 | Nov 2017 | 0.836 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 3.152 | - |
| T-45 Test Wing Maintenance | C/FFP | L-3 : Patuxent River, MD | 2.521 | 1.627 | Oct 2017 | 2.237 | Oct 2018 | 2.000 | Oct 2019 | - | | 2.000 | 3.200 | 11.585 | 11.585 |
| T45 PBTH Flight Hours | C/FFP | Rolls Royce : Indianapolis, IN | 0.179 | 0.089 | May 2018 | 0.257 | May 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.525 | 0.525 |
| T45 Travel | Various | NAVAIR : Patuxent River, MD | 0.075 | 0.093 | Oct 2017 | 0.055 | Oct 2018 | 0.055 | Oct 2019 | - | | 0.055 | 0.110 | 0.388 | - |
| T6 Travel | Various | NAVAIR : Patuxent River, MD | 0.149 | 0.030 | Oct 2017 | 0.030 | Oct 2018 | 0.035 | Oct 2019 | - | | 0.035 | 0.090 | 0.334 | - |
| TH57 Travel | Various | Various : Various | 0.033 | 0.029 | Oct 2017 | 0.030 | Oct 2018 | 0.030 | Oct 2019 | - | | 0.030 | 0.090 | 0.212 | - |
| Prior Year Mgmt costs no longer funded in FYDP | Various | Various : Various | 3.504 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.504 | - |
| | | **Subtotal** | 8.018 | 2.627 | | 3.445 | | 2.120 | | - | | 2.120 | 3.490 | 19.700 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 47.043 | 14.798 | | 12.798 | | 15.514 | | - | | 15.514 | 19.767 | 109.920 | N/A |

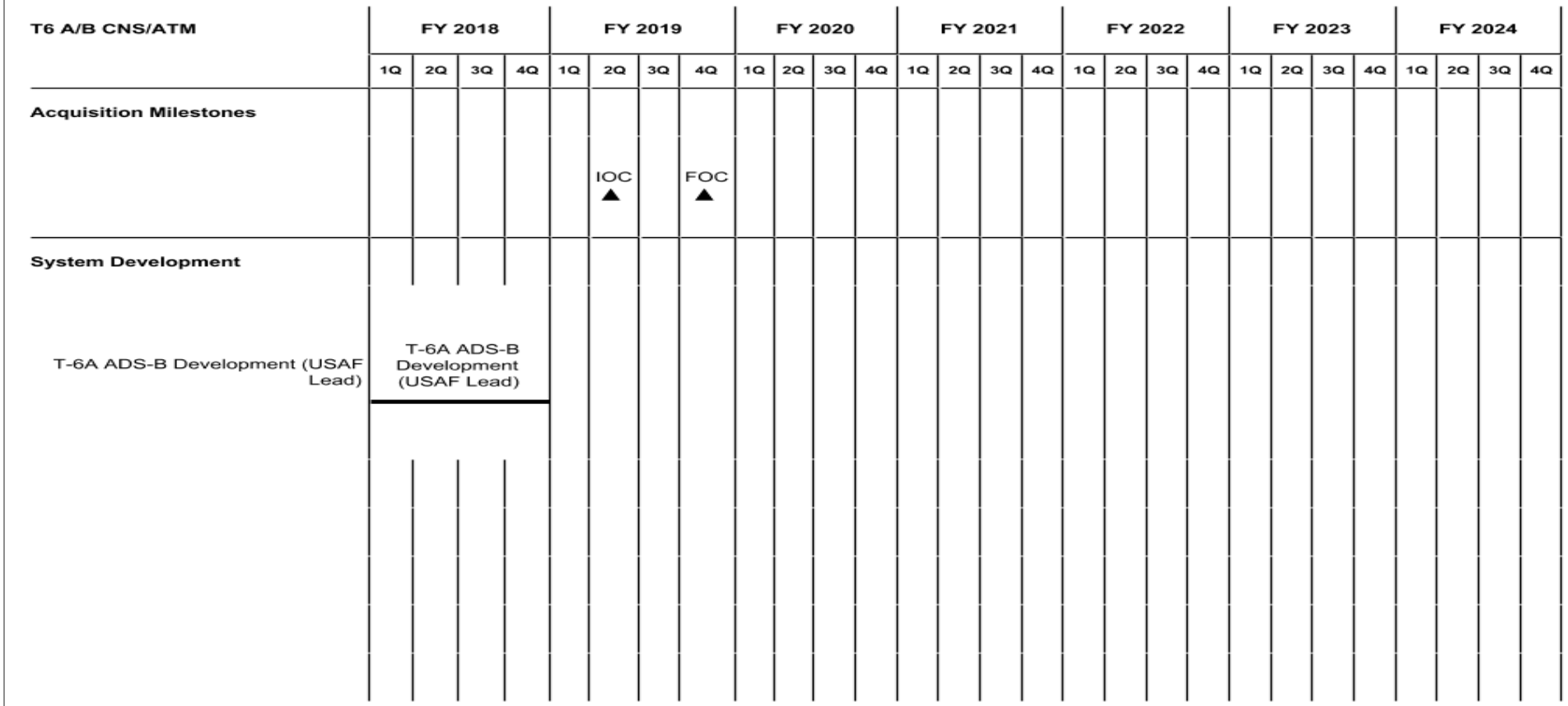
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |



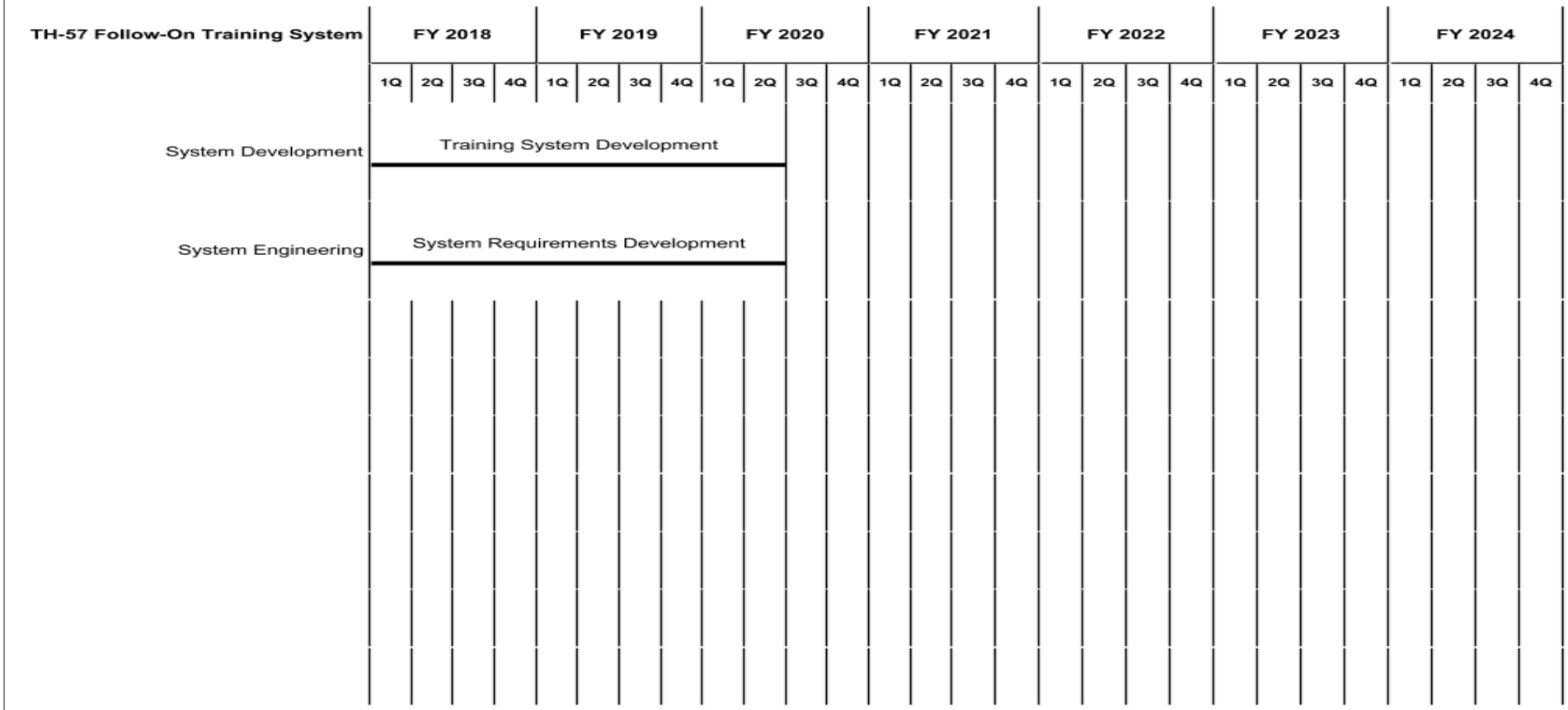

*2020PB - 0603208N - 3367*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |



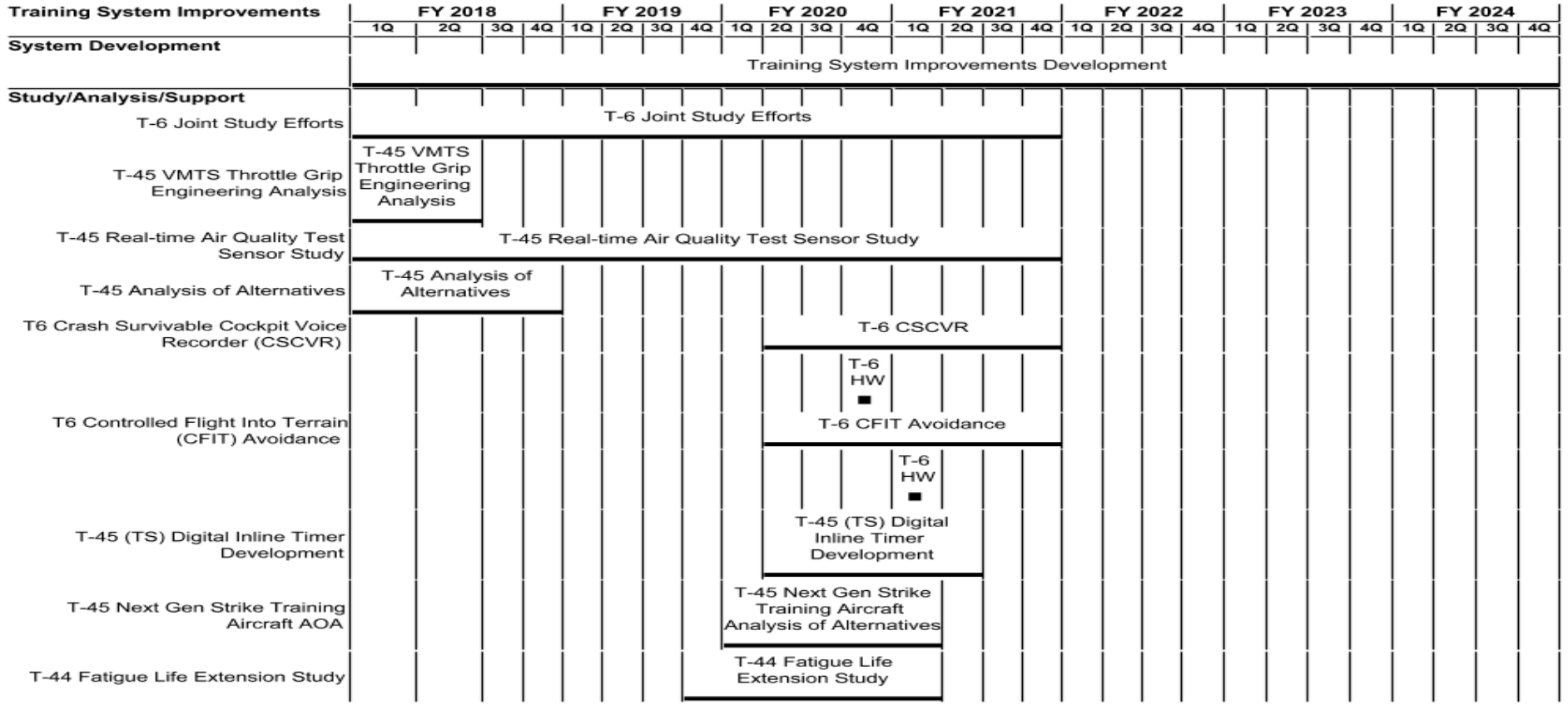

*2020PB - 0603208N - 3367 Automatic Dependent Surveillance-Broadcast (ADS-B). T-6A ADS-B Development is Air Force led. T-6B ADS-B Development is Navy led. Reviews, T&E & Test Assets listed reflect T-6B Development efforts.*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |



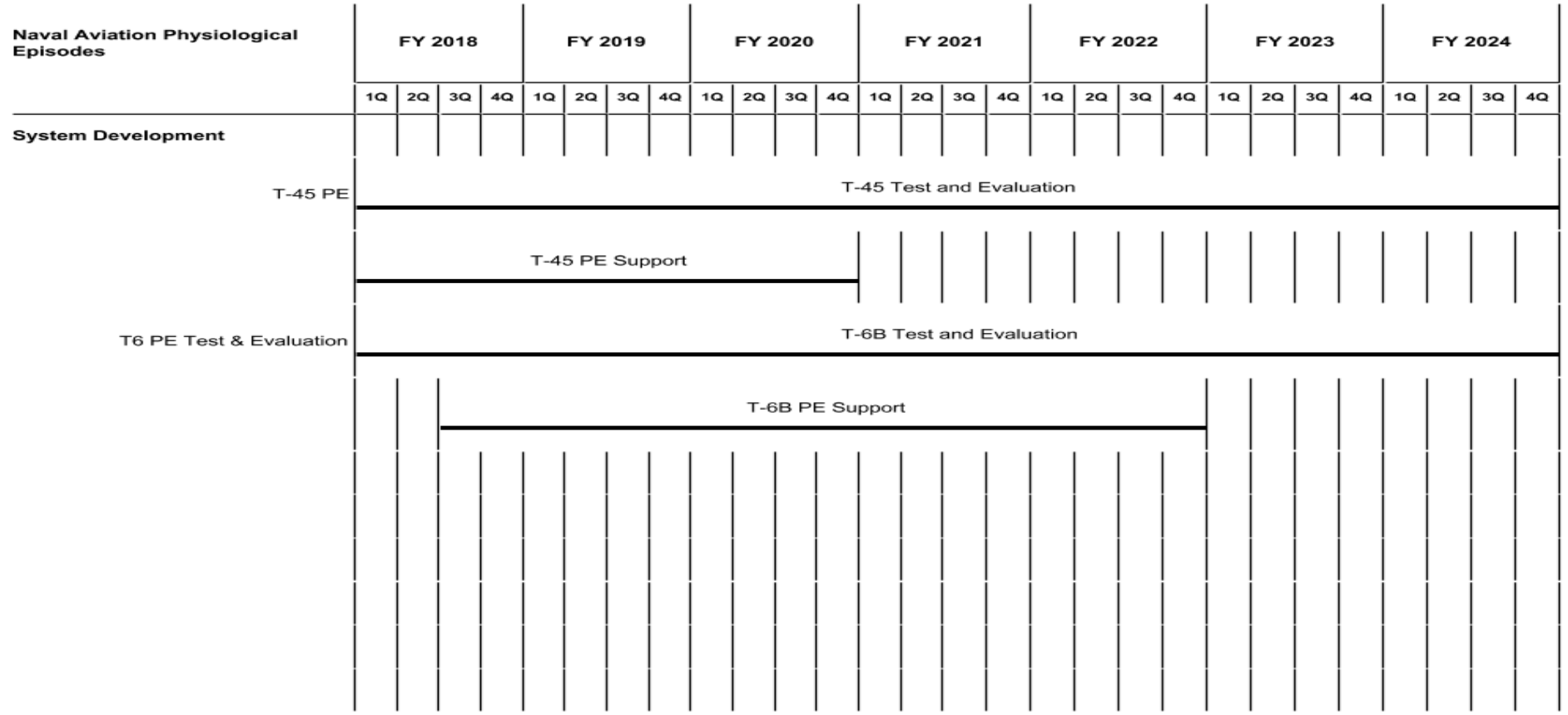

*2020PB - 0603208N - 3367*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |




*2020PB - 0603208N - 3367*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |




*2020PB - 0603208N - 3367*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***T45 RASP*** | | | | |
| System Development: Hardware Development: T45 Hardware Development | 1 | 2018 | 1 | 2019 |
| Reviews: T45 Critical Design Review | 2 | 2018 | 2 | 2018 |
| Test & Evaluation: Technical Evaluation: T45 Integrated Test & Evaluation | 2 | 2019 | 3 | 2019 |
| Deliveries: Lab Assets: T45 Lab Assets | 2 | 2018 | 3 | 2018 |
| Deliveries: Test Assets: T45 Test Assets | 3 | 2018 | 3 | 2019 |
| ***T6 A/B CNS/ATM*** | | | | |
| Acquisition Milestones: Initial Operational Capability | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: Full Operational Capability | 4 | 2019 | 4 | 2019 |
| System Development: T-6A ADS-B Development (USAF Lead): T-6A ADS-B Development | 1 | 2018 | 4 | 2018 |
| ***TH-57 Follow-On Training System*** | | | | |
| System Development: Follow-On Training System Development | 1 | 2018 | 2 | 2020 |
| System Engineering: Follow-On Training System Requirements Development | 1 | 2018 | 2 | 2020 |
| ***Training System Improvements*** | | | | |
| System Development: Training System Improvements Development | 1 | 2018 | 4 | 2024 |
| Study/Analysis/Support: T-6 Joint Study Efforts: T-6 Joint Study Efforts | 1 | 2018 | 4 | 2020 |
| Study/Analysis/Support: T-45 VMTS Throttle Grip Engineering Analysis: T-45 VMTS Throttle Grip Engineering Analysis | 1 | 2018 | 2 | 2018 |
| Study/Analysis/Support: T-45 Real-time Air Quality Test Sensor Study: T-45 Real-time Air Quality Test Sensor Study | 1 | 2018 | 4 | 2021 |
| Study/Analysis/Support: T-45 Analysis of Alternatives: T-45 Analysis of Alternatives | 1 | 2018 | 4 | 2018 |
| Study/Analysis/Support: T6 Crash Survivable Cockpit Voice Recorder (CSCVR): T6 Crash Survivable Cockpit Voice Recorder (CSCVR) | 2 | 2020 | 4 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>3367 / *Training Aircraft Updates* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Study/Analysis/Support: T6 Crash Survivable Cockpit Voice Recorder (CSCVR): T6 CSCVR Hardware Test | 4 | 2020 | 4 | 2020 |
| Study/Analysis/Support: T6 Controlled Flight Into Terrain (CFIT) Avoidance: T6 Controlled Flight Into Terrain (CFIT) Avoidance | 2 | 2020 | 4 | 2021 |
| Study/Analysis/Support: T6 Controlled Flight Into Terrain (CFIT) Avoidance: T6 CFIT Hardware Test | 1 | 2021 | 1 | 2021 |
| Study/Analysis/Support: T-45 (TS) Digital Inline Timer Development: T-45 (TS) Digital Inline Timer Development | 2 | 2020 | 2 | 2021 |
| Study/Analysis/Support: T-45 Next Gen Strike Training Aircraft AOA: T-45 Next Gen Strike Training Aircraft Analysis of Alternatives | 1 | 2020 | 1 | 2021 |
| Study/Analysis/Support: T-44 Fatigue Life Extension Study: T-44 Fatigue Life Extension Study | 4 | 2019 | 1 | 2021 |
| ***Naval Aviation Physiological Episodes*** | | | | |
| System Development: T-45 PE: T-45 Acceptance Test | 1 | 2018 | 4 | 2024 |
| System Development: T-45 PE: T-45 PE Support | 1 | 2018 | 4 | 2020 |
| System Development: T6 PE Test & Evaluation: T6 Acceptance Test | 1 | 2018 | 4 | 2024 |
| System Development: T6 PE Test & Evaluation: T-6B PE Support | 3 | 2018 | 4 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0603208N / *Training System Aircraft* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 1.545 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.545 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Congressional Add.

T-45 Physiological Episode (PE) mitigation studies and development efforts.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** T-45 and F/A-18 Physiological Episodes | 1.545 | 0.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 1.545 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not Required for Congressional Adds.

**E. Performance Metrics**

Not Required for Congressional Adds.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0603208N / *Training System Aircraft* | Project (Number/Name)<br>9999 / *Congressional Adds* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T-45 PE Mitigation (HMAPS) | C/CPFF | Athena GTX INC. : Des Moines, IA | 0.000 | 0.750 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.750 | 0.750 |
| T-45 PE Mitigation (JHU/ APL) | C/CPFF | NAVSEA : JHU/APL | 0.000 | 0.785 | Jan 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.785 | 0.785 |
| | | **Subtotal** | 0.000 | 1.535 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.535 | N/A |

**Remarks**

T45 PE: FY2018 Development Costs support Holistic Modular Aircrew Physiologic Status (HMAPS) Monitoring System Development.
T45 PE: FY2018 Development Costs support PE Mitigation efforts

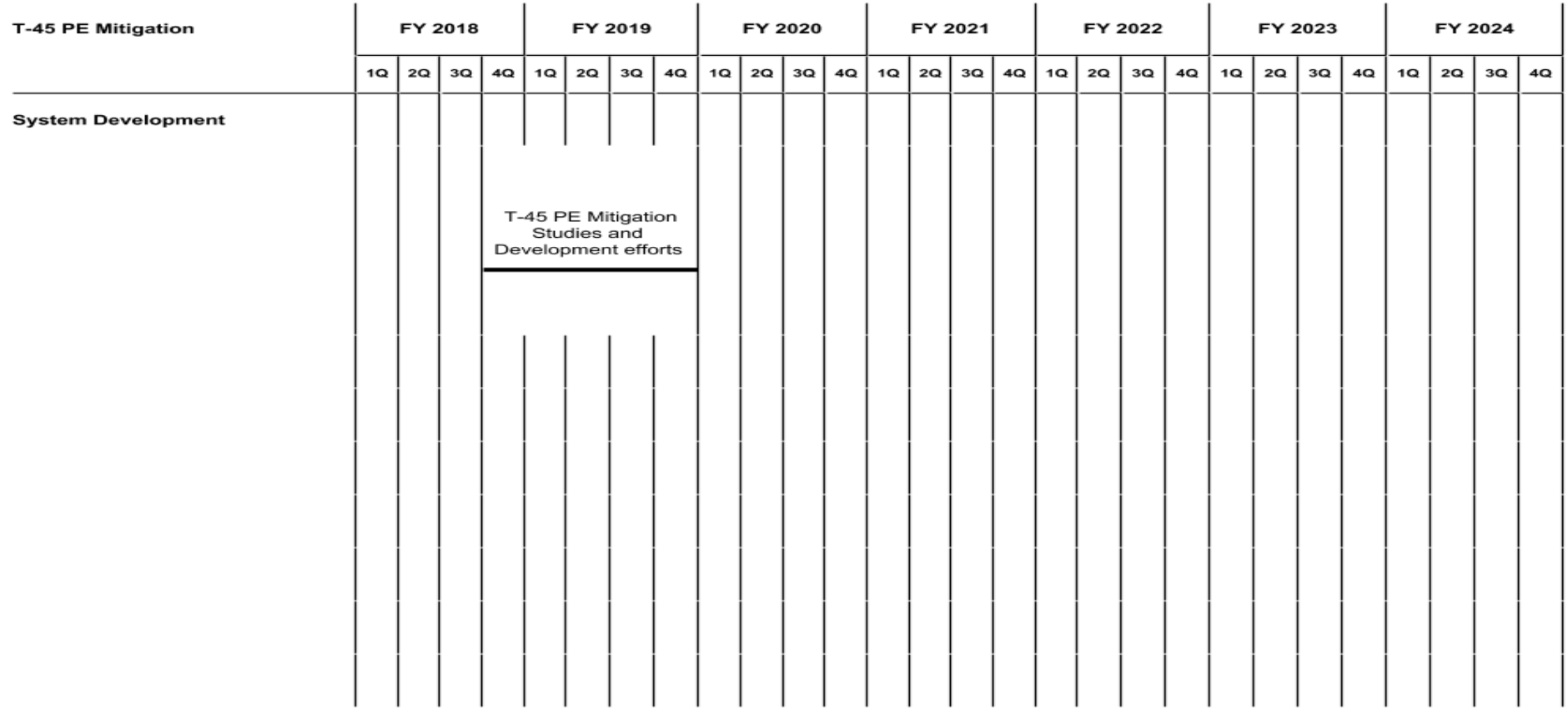
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T-45 PE Mitigation Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.010 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.010 | - |
| | | **Subtotal** | 0.000 | 0.010 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.010 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 1.545 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.545 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020DON - 0603208N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0603208N / *Training System Aircraft* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***T-45 PE Mitigation*** | | | | |
| System Development: T-45 PE Mitigation Studies and Development efforts | 4 | 2018 | 4 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604212N / *Other Helicopter Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 93.773 | 26.423 | 23.579 | 28.835 | - | 28.835 | 54.458 | 122.976 | 148.231 | 151.192 | Continuing | Continuing |
| 1109: *CH/MH-53* | 58.003 | 17.234 | 12.409 | 16.454 | - | 16.454 | 9.062 | 2.552 | 2.594 | 2.644 | Continuing | Continuing |
| 2460: *VH-3/VH-60* | 35.770 | 1.301 | 1.310 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 38.381 |
| 3406: *Attack and Utility Replacement Aircraft* | 0.000 | 7.888 | 9.860 | 12.381 | - | 12.381 | 45.396 | 120.424 | 145.637 | 148.548 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This Program Element includes funding for the development support for improvements to current systems for CH/MH-53, MH-60 development, VH-3/VH-60, and new development of Attack and Utility Replacement Aircraft (AURA) capability. The H-53 is the premier heavy lift helicopter for the Marine Corps and the only operational airborne mine sweeping platform for the Navy. H-53 RDT&E efforts focus on trade studies and risk reduction measures to identify candidate survivability, safety, avionics, cargo handling, cockpit and other airframe specific improvements to extend the service life. The VH-3/VH-60 is required to provide safe and timely transportation for the President and Vice President of the United States, heads of state and others as directed by the White House Military Office. AURA is a Joint Department initiative to address vertical lift capability requirements and determine feasible and affordable solutions in support of the Joint Warfighter.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 26.786 | 32.128 | 33.940 | - | 33.940 |
| Current President's Budget | 26.423 | 23.579 | 28.835 | - | 28.835 |
| Total Adjustments | -0.363 | -8.549 | -5.105 | - | -5.105 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -8.549 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.363 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -5.520 | - | -5.520 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.415 | - | 0.415 |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $2.873 million to account for the availability of prior year execution balances.

2460 VH-3/VH-60: FY 2020 decrease in funding due to completion of efforts for VH Executive Helicopter Aircraft Life Management Program.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604212N *I Other Helicopter Development* |

Cost/Technical/Schedule:
1109 CH/MH-53: Not Applicable
2460 VH-3/VH-60: Not Applicable
3406 Attack and Utility Replacement Aircraft: Not Applicable

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604212N / *Other Helicopter Development* | Project (Number/Name)<br>1109 / *CH/MH-53* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1109: *CH/MH-53* | 58.003 | 17.234 | 12.409 | 16.454 | - | 16.454 | 9.062 | 2.552 | 2.594 | 2.644 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The H-53 helicopter is the premier heavy lift helicopter for the Marine Corps and the only operational airborne mine sweeping platform for the Navy. H-53 efforts will continue to develop and qualify components, prior to production and approval decisions, in order to replace obsolete system components. Emphasis will be placed on supportability improvement modifications that will sustain the H-53 aircraft until the transition of the H-53K is complete. These efforts combined, will significantly improve the readiness of the H-53 fleet while reducing long term operational and supportability costs. Survivability efforts to address improved situational awareness to pilots will include improved Digital Interoperability and improve Degraded Visual Environment Awareness. Modeling and simulation will be used to the maximum practical extent throughout this effort. Manned Flight Simulator will be utilized to develop, install and test interim modifications to existing H-53 legacy avionics, while maintaining the original basic system footprint and functionality. As a part of this effort, a complete Electro Magnetic Vulnerability assessment will be required for the affected and/or modified systems.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** H-53 Avionics | 2.848 | 3.716 | 4.960 | 0.000 | 4.960 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Integrate software applications for cockpit and avionics improvements, to include the development of new sensors. Develop flight control computer and test set design modifications to address anticipated obsolescence issues. Conduct Business Case Analyses to determine impact of high Operation and Support cost drivers and address alternatives to mitigate identified issues. Development and Integration of improved Degraded Visual Environmental Awareness to include coupled flight control capability. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue to integrate software applications for cockpit and avionics improvements, to include the development of new sensors. Develop flight control computer and test set design modifications to address anticipated obsolescence issues. Conduct Business Case Analyses to determine impact of high Operation and Support cost drivers and address alternatives to mitigate identified issues. Development and Integration of improved Degraded Visual Environmental/Low Speed Precision Control Awareness to include coupled flight control capability. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $1.244M from FY 2019 to FY 2020 is required for test set development, hardware and software development efforts, and ground and flight tests required for Degraded Visual Environment (DVE)/Low Speed Precision Control (LSPC) integration. | | | | | |
| ***Title:*** H-53 Survivability | 1.296 | 1.472 | 2.013 | 0.000 | 2.013 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Perform trade studies, risk reduction, design, development, model, integration and test activities for H-53 survivability to include increased situational awareness via digital interoperability.<br><br>***FY 2020 Base Plans:***<br>Continue to perform trade studies, risk reduction, design, development, model, integration and test activities for H-53 safety and survivability to include increased situational awareness via digital interoperability/Low Speed Precision Control.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $.541M from FY 2019 to FY 2020 funds additional requirements for situational awareness in the H-53E aircraft. | | | | | |
| ***Title:*** H-53 Propulsion | 0.442 | 0.450 | 0.413 | 0.000 | 0.413 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct Business Case Analyses to determine impact of high Operation and Support Propulsion cost drivers. Develop, manufacture and test the new production T-64 fuel control prototype to improve safety, operability, reliability, while eliminating obsolescence issues.<br><br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue to conduct Business Case Analyses to determine impact of high Operation and Support Propulsion cost drivers. Develop, manufacture and test the new production T-64 fuel control prototype to improve safety, operability, reliability, while eliminating obsolescence issues.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>There is no significant change from FY 2019 to FY 2020. | | | | | |
| ***Title:*** Project Management Support | 1.620 | 1.652 | 1.620 | 0.000 | 1.620 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Provide in-house, field activity, and contractor support of IPTs to allow for studies and analyses, preparation of acquisition documentation and examination of equipment and avionics for the H-53. Efforts include, but are not limited to, government development support, engineering support, product management support, system engineering and logistics support, and travel for the H-53 program.<br>***FY 2020 Base Plans:***<br>Continue to provide in-house, field activity, and contractor support of IPTs to allow for studies and analyses, preparation of acquisition documentation and examination of equipment and avionics for the H-53. Efforts include, but are not limited to, government development support, engineering support, product management support, system engineering and logistics support, and travel for the H-53 program.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>There is no significant change from FY 2019 to FY 2020. | | | | | |
| ***Title:*** H-53 Airframe | 2.175 | 1.554 | 1.429 | 0.000 | 1.429 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Develop software tool to support aircraft diagnostics, health monitoring and Fatigue Life Estimating (FLE) which will interface with Naval Enterprise Logistics Support Systems. The systems will provide a seamless environment for processing data, troubleshooting and documenting the technical updates required for the H-53 airframe. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue to develop tools to study/analyze and qualify components, prior to production and approval decisions, in order to replace obsolete system components. Perform trade studies, risk reduction, design, development, integration and test activities for the H-53 airframe to include, but not limited to, main rotor head, cowlings, aircraft structure, drive train, and various dynamic components.<br>***FY 2020 Base Plans:***<br>Continue to develop software tool to support aircraft diagnostics, health monitoring and Fatigue Life Estimating (FLE) which will interface with Naval Enterprise Logistics Support Systems. The systems will provide a seamless environment for processing data, troubleshooting and documenting the technical updates required for the H-53 airframe. Continue to develop tools to study/analyze and qualify components, prior to production and approval decisions, in order to replace obsolete system components. Perform trade studies, risk reduction, design, development, integration and test activities for the H-53 airframe to include, but not limited to, main rotor head, cowlings, aircraft structure, drive train, and various dynamic components.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $.125M from FY 2019 to FY 2020 due to decrease in Fatigue life Estimating test events. | | | | | |
| ***Title:*** APR-39D(V)2 | 8.853 | 3.565 | 6.019 | 0.000 | 6.019 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue development and integration of APR-39D(V)2 to consolidate digital interoperability and improve the probability of detection against radar guided threats. Corrects deficiencies from previous receiver by enabling self protection from radar guided threats on the battlefield.<br>***FY 2020 Base Plans:***<br>Continue development and integration of APR-39D(V)2 to consolidate digital interoperability and improve the probability of detection against radar guided threats. Corrects deficiencies from previous receiver by enabling self protection from radar guided threats on the battlefield.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The FY20 funding increase supports APR-39 contract costs. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 17.234 | 12.409 | 16.454 | 0.000 | 16.454 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0528: *H-53 Series* | 39.125 | 51.965 | 40.513 | - | 40.513 | 74.341 | 135.652 | 188.034 | 170.881 | Continuing | Continuing |

**Remarks**

APN-5 funding profile does not include funding designated for the CH-53K aircraft (OSIPS 007-19 and 008-19).

**D. Acquisition Strategy**

This is a non-ACAT program. H-53 RDT&E efforts will focus on trade studies and risk reduction measures to identify candidate survivability, interoperability, safety, avionics, cargo handling, cockpit and other airframe specific improvements to extend the service life.

**E. Performance Metrics**

Successfully perform studies, analysis and develop software to address emergent H-53 issues. Successfully support developmental and operation test activities to qualify aircraft modifications/upgrades.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWC AD : Patuxent River, MD | 5.573 | 1.618 | Nov 2017 | 0.784 | Nov 2018 | 1.518 | Nov 2019 | - | | 1.518 | Continuing | Continuing | Continuing |
| Systems Engineering Contract | C/CPFF | Various : Various | 0.737 | 0.500 | Feb 2018 | 1.191 | Feb 2019 | 1.191 | Feb 2020 | - | | 1.191 | 0.000 | 3.619 | 3.619 |
| Systems Engineering | WR | Various : Various | 0.540 | 0.600 | Nov 2017 | 1.616 | Nov 2018 | 1.953 | Nov 2019 | - | | 1.953 | Continuing | Continuing | Continuing |
| Design and Development | WR | Various : Various | 0.000 | 4.729 | Mar 2018 | 1.839 | Mar 2019 | 1.323 | Mar 2020 | - | | 1.323 | 0.000 | 7.891 | - |
| Prior Year Prod Dev no longer funded in the FYDP | TBD | TBD : TBD | 19.475 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.475 | - |
| | | **Subtotal** | 26.325 | 7.447 | | 5.430 | | 5.985 | | - | | 5.985 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | Various | Various : Various | 5.143 | 4.876 | Mar 2018 | 2.175 | Mar 2019 | 4.865 | Mar 2020 | - | | 4.865 | Continuing | Continuing | Continuing |
| GFE | Various | NAWC AD : Patuxent River, MD | 3.581 | 0.137 | Nov 2017 | 0.280 | Nov 2018 | 0.280 | Nov 2019 | - | | 0.280 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.724 | 5.013 | | 2.455 | | 5.145 | | - | | 5.145 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | Various | Various : Various | 8.914 | 1.674 | Mar 2018 | 1.835 | Mar 2019 | 2.420 | Mar 2020 | - | | 2.420 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.914 | 1.674 | | 1.835 | | 2.420 | | - | | 2.420 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

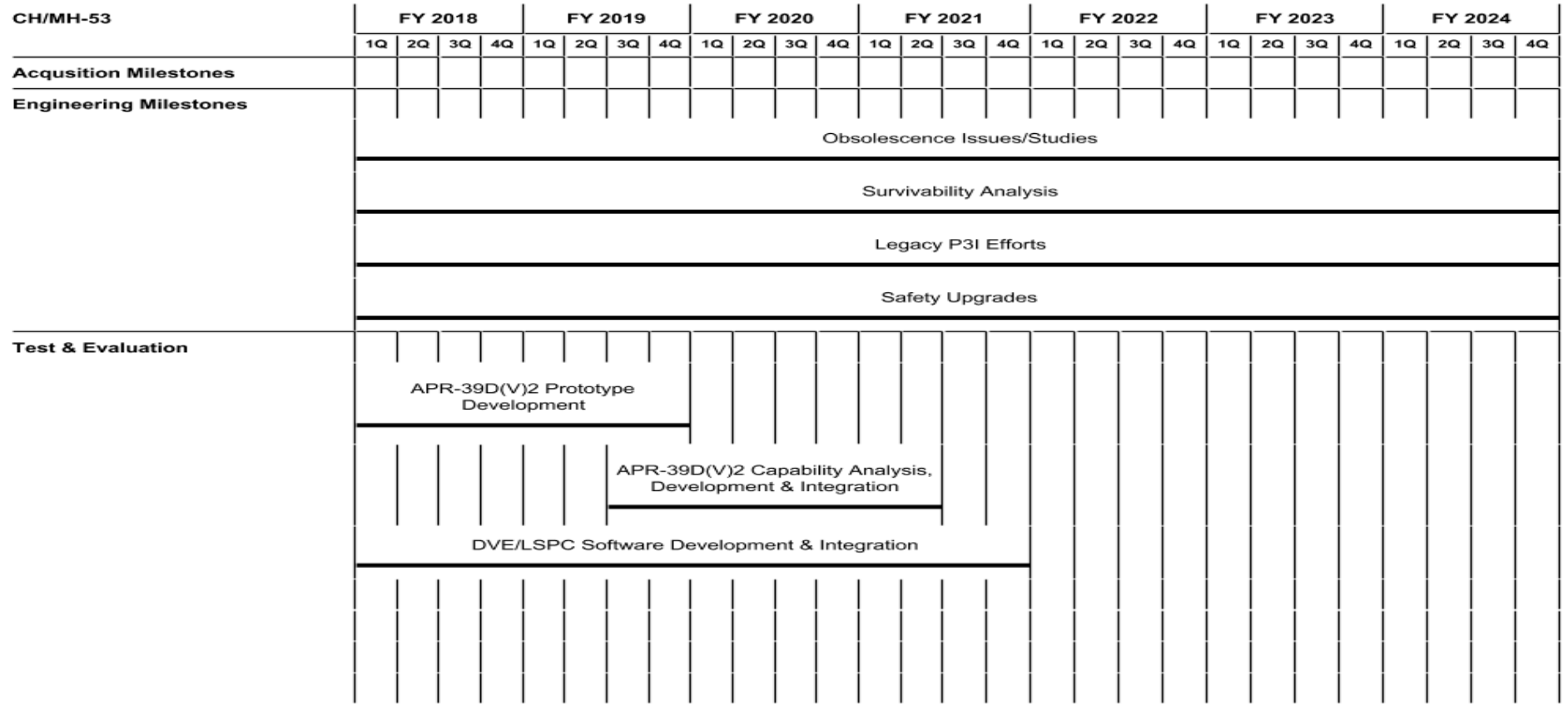
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWC AD : Patuxent River, MD | 7.318 | 2.950 | Nov 2017 | 2.439 | Nov 2018 | 2.654 | Nov 2019 | - | | 2.654 | Continuing | Continuing | Continuing |
| Travel | Various | Various : Various | 2.048 | 0.150 | Oct 2017 | 0.250 | Oct 2018 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| Prior Year Mgmt no longer funded in the FYDP | Various | Various : Various | 4.674 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.674 | - |
| | | **Subtotal** | 14.040 | 3.100 | | 2.689 | | 2.904 | | - | | 2.904 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 58.003 | 17.234 | | 12.409 | | 16.454 | | - | | 16.454 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |




*2020DON - 0604212N - 1109*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>1109 / *CH/MH-53* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***CH/MH-53*** | | | | |
| Engineering Milestones: - Obsolescence Issues/Studies | 1 | 2018 | 4 | 2024 |
| Engineering Milestones: - Survivability Analysis | 1 | 2018 | 4 | 2024 |
| Engineering Milestones: - Legacy P3I Efforts | 1 | 2018 | 4 | 2024 |
| Engineering Milestones: - Safety Upgrades | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: APR-39D(V)2 Prototype Development | 1 | 2018 | 4 | 2019 |
| Test & Evaluation: APR-39D(V)2 Capability Analysis, Development & Integration | 3 | 2019 | 2 | 2021 |
| Test & Evaluation: Degraded Visual Environment/Low Speed Precision Control Development & Integration | 1 | 2018 | 4 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604212N / *Other Helicopter Development* | Project (Number/Name)<br>2460 / *VH-3/VH-60* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2460: *VH-3/VH-60* | 35.770 | 1.301 | 1.310 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 38.381 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Marine Helicopter Squadron One (HMX-1) is required to provide safe and timely transportation for the President and Vice President of the United States, heads of state and others as directed by the White House Military Office. Currently two Type, Model, Series aircraft are used by HMX-1 for the Presidential support mission - the VH-3D and the VH-60N. This project currently funds the VH Executive Helicopter's Aircraft Life Management Program (ALMP).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** VH Executive Helicopter Aircraft Life Management Program | 1.301 | 1.310 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** VH Executive Helicopter Aircraft Life Management Program: Provides for management and improvement of all Executive Helicopter systems readiness including safety, operational weight, mission availability, structural integrity, component reliability, maintainability, software, and obsolescence issues as they arise. | | | | | |
| ***FY 2019 Plans:***<br>Provide government program management and engineering support for efforts associated with the Aircraft Life Management Program ensuring aircraft availability and mission readiness to the VH Executive Helicopters. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 decrease due to completion of VH Executive Helicopter Aircraft Life Management Program efforts. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.301 | 1.310 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>2460 / *VH-3/VH-60* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/056600: *Executive Helicopters Series* | 31.787 | 23.566 | 8.933 | - | 8.933 | 28.751 | 60.690 | 76.978 | 78.505 | Continuing | Continuing |

**Remarks**

Results of the Aircraft Life Management Program trade studies and risk reduction efforts will lead to modifications to be addressed through the program's Obsolescence Management Program and VH Comm Suite Upgrade Operational Safety and Improvement Programs as directed by the Deputy Secretary of Defense.

**D. Acquisition Strategy**

VH Executive Helicopter ALMP will include trade studies and risk reduction efforts necessary to address safety, operational weight, mission availability, structural integrity, component reliability, maintainability, software, and obsolescence issues as they arise.

**E. Performance Metrics**

Completion of VH Executive Helicopter Aircraft Life Management Program efforts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604212N / *Other Helicopter Development* | Project (Number/Name)<br>2460 / *VH-3/VH-60* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | SS/CPFF | Sikorsky : Stratford, CT | 8.675 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.675 | 8.675 |
| Primary HW Development | SS/CPFF | Sikorsky : Stratford, CT | 0.899 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.899 | 0.899 |
| Software Development | SS/FFP | Rockwell Collins : Cedar Rapids, IA | 2.425 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.425 | 2.425 |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 1.987 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.987 | - |
| Systems Engineering | Various | Various : Various | 0.607 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.607 | - |
| Prior Year Prod Dev no longer funded in the FYDP | Various | Various : Various | 5.321 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.321 | - |
| Systems Engineering | SS/FFP | Lockheed Martin : Greenfield, SC | 0.000 | 0.000 | | 0.342 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.342 | 0.342 |
| | | **Subtotal** | 19.914 | 0.000 | | 0.342 | | 0.000 | | - | | 0.000 | 0.000 | 20.256 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation-WBLoS | WR | NAWCAD : Patuxent River, MD | 2.102 | 0.299 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.401 | - |
| | | **Subtotal** | 2.102 | 0.299 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.401 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 3.234 | 0.952 | Nov 2017 | 0.938 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 5.124 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>2460 / *VH-3/VH-60* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering | SS/CPFF | NAVSEA : Washington Navy Yard, DC | 0.630 | 0.020 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.650 | 0.650 |
| Travel | Various | Various : Various | 0.397 | 0.030 | Oct 2017 | 0.030 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.457 | - |
| Prior Year Mgmt Services no longer funded in the FYDP | Various | Various : Various | 9.493 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.493 | - |
| | | **Subtotal** | 13.754 | 1.002 | | 0.968 | | 0.000 | | - | | 0.000 | 0.000 | 15.724 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 35.770 | 1.301 | | 1.310 | | 0.000 | | - | | 0.000 | 0.000 | 38.381 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>2460 / *VH-3/VH-60* |

| | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| ***VH-3/VH-60*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Engineering Milestones: VH-3D / VH-60N ALMP | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>2460 / *VH-3/VH-60* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***VH-3/VH-60*** | | | | |
| Engineering Milestones: VH-3D / VH-60N ALMP | 1 | 2018 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604212N / *Other Helicopter Development* | Project (Number/Name)<br>3406 / *Attack and Utility Replacement Aircraft* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3406: *Attack and Utility Replacement Aircraft* | 0.000 | 7.888 | 9.860 | 12.381 | - | 12.381 | 45.396 | 120.424 | 145.637 | 148.548 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Attack and Utility Replacement Aircraft (AURA) is a Joint Department initiative to address vertical lift capability requirements and determine feasible and affordable solutions in support of the Joint Warfighter. The AURA Capability Set 3 (CS3) program, led by the Department of the Army, will develop and field a replacement for US Army and USMC aircraft with a more capable, maintainable, and reliable rotorcraft to meet the needs of the services. AURA will provide unmatched strategic, operational, and tactical agility to perform a multitude of missions currently unachievable by any conventionally configured rotorcraft. AURA will be a force multiplier with superior performance, payload, survivability, agility, endurance, and reliability that enables warfighters to win in a complex world. AURA offers revolutionary operational opportunities over current Vertical Take Off Landing (VTOL) aircraft and will field by 2031.

The Marine Corps AURA requirements emphasize range and speed similar to the MV-22. AURA will increase the Marine Air Ground Task Force's (MAGTF) capacity of long-range fires. AURA will utilize DOTmLPF-P that will include all facets of a program with particular focus on life-cycle cost reductions through common processes, support equipment, logistic support and component commonality utilizing non-materiel solutions, such as maintenance strategies, training solutions, and infrastructure requirements. The air vehicle will include primary mechanical, electrical, pneumatic, and structural components such as drivetrain, generators, landing gear, pumps, controls, seats, etc. The mission subsystems will include all on- and off-board components with embedded control software for those components that provide all mission functionality, cockpit displays, cockpit hardware subsystem controllers, and interfaces. The architecture will include the fundamental organization of the complete system, the processing method/component(s), the system level software, the operating environment, and the on-aircraft infrastructure to facilitate integration of all subsystems and platform.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Attack and Utility Replacement Aircraft | 7.888 | 9.860 | 12.381 | 0.000 | 12.381 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |
| FY 2019 BASE PLANS WEAPONS AND SENSORS TESTING AND INTEGRATION: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>3406 / *Attack and Utility Replacement Aircraft* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue initial support for Attack and Utility Replacement (AURA) Analysis of Alternatives (AoA) to assess the technical feasibility, technical risk, and affordability of potential strategic solutions with the intent to develop the next generation of rotary wing aircraft supporting new Vertical Take Off Landing capabilities common with the US Army. Tasks to be performed include but are not limited to: AoA support, Acquisition Program Management functions, Engineering modeling and analysis, TEMP development, System Specification and Draft Capability Development Document development, and design trade studies and prototyping on the Air Vehicle and all associated systems. These efforts will include but not be limited to studies, virtual simulation, conceptual design, prototyping of Air Vehicle, Avionics, Propulsion and Dynamics, Communications and Navigation, Weapons and Fire Control, Human Systems Integration, Survivability and Vulnerability, Missions and Missions Systems Management, Reliability and Maintainability, Training, Logistics, Sensor, Pilotage and Targeting Systems, VMS/Flight Control, and Software/Hardware architecture. Support for these efforts will come from government, industry and academia such as Naval Research Labs, DARPA, John Hopkins APL, and various industry partners.<br><br>Continued AURA contract awards for FY19 for contract support services, academia, or industry quick turn studies. All contract actions will be smaller scale efforts to support the overall initial AoA effort.<br><br>***FY 2020 Base Plans:***<br>FY 2020 BASE PLANS WEAPONS AND SENSORS TESTING AND INTEGRATION:<br>Continue initial support for Attack and Utility Replacement (AURA) Analysis of Alternatives (AoA) to assess the technical feasibility, technical risk, and affordability of potential strategic solutions with the intent to develop the next generation of rotary wing aircraft supporting new Vertical Take Off Landing capabilities common with the US Army. Tasks to be performed include but are not limited to: AoA support, Acquisition Program Management functions, Engineering modeling and analysis, TEMP development, System Specification and Draft Capability Development Document development, and design trade studies and prototyping on the Air Vehicle and all associated systems. These efforts will include but not be limited to studies, virtual simulation, conceptual design, prototyping of Air Vehicle, Avionics, Propulsion and Dynamics, Communications and Navigation, Weapons and Fire Control, Human Systems Integration, Survivability and Vulnerability, Missions and Missions Systems Management, Reliability and Maintainability, Training, Logistics, Sensor, Pilotage and Targeting Systems, VMS/Flight Control, and Software/Hardware architecture. Support for these efforts will come from government, industry and academia such as Naval Research Labs, DARPA, John Hopkins APL, and various industry partners.<br><br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>3406 / *Attack and Utility Replacement Aircraft* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase from FY2019 to FY2020 funds risk mitigation studies and staffing increases to support a condensed timeline to the milestone. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.888 | 9.860 | 12.381 | 0.000 | 12.381 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The Army initiated an Analysis of Alternatives (AoA) in the 3rd Quarter FY 2017 to begin the assessment of the technical feasibility, operational feasibility, technical risk, and affordability of potential solutions. The AoA will take advantage of previous studies, ongoing Advanced Technology Development Science & Technology (S&T) projects, and input from Government, Industry and Academia. The results of the AoA and Technology Readiness Assessments will be used to assist in determining if a Milestone A or Milestone B entry is appropriate. Once the appropriate Milestone entry point has been determined, the program will enter at the appropriate Milestone with an appropriate RFP Release. The program will complete development and testing of the most cost effective system before entering the Production and Deployment phase in the FY2031 timeframe.

**E. Performance Metrics**

A studies and analysis contract will be awarded 2Q FY 2020.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>3406 / *Attack and Utility Replacement Aircraft* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 3.947 | Mar 2018 | 2.990 | Jan 2019 | 2.996 | Jan 2020 | - | | 2.996 | Continuing | Continuing | Continuing |
| Development Support | WR | TBD : TBD | 0.000 | 0.814 | Jun 2018 | 0.550 | Jan 2019 | 0.800 | Jan 2020 | - | | 0.800 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 4.761 | | 3.540 | | 3.796 | | - | | 3.796 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test and Evaluation | WR | TBD : TBD | 0.000 | 0.575 | Mar 2018 | 0.587 | Nov 2018 | 0.511 | Nov 2019 | - | | 0.511 | Continuing | Continuing | Continuing |
| Studies and Anaylsis | C/CPFF | TBD : TBD | 0.000 | 0.175 | Mar 2018 | 3.640 | Jan 2019 | 5.766 | Jan 2020 | - | | 5.766 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.750 | | 4.227 | | 6.277 | | - | | 6.277 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | C/CPIF | Various : Various | 0.000 | 0.100 | Mar 2018 | 0.000 | Nov 2018 | 0.238 | Nov 2019 | - | | 0.238 | Continuing | Continuing | Continuing |
| Program Management Support | TBD | Various : Various | 0.000 | 2.072 | Mar 2018 | 1.613 | Nov 2018 | 1.657 | Nov 2019 | - | | 1.657 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604212N / *Other Helicopter Development* | Project (Number/Name)<br>3406 / *Attack and Utility Replacement Aircraft* | |

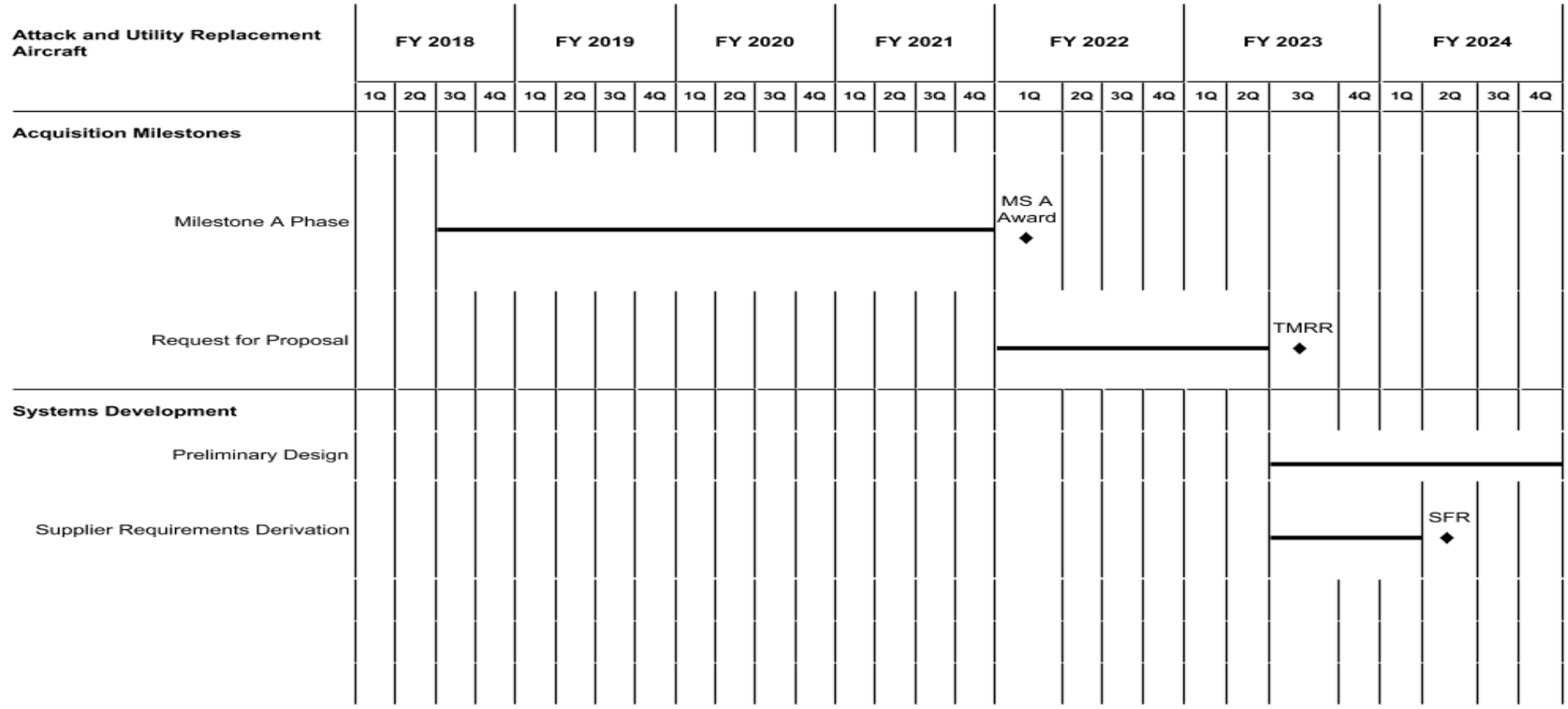
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | NAVAIR : Patuxent River, MD | 0.000 | 0.205 | Mar 2018 | 0.480 | Oct 2018 | 0.413 | Oct 2019 | - | | 0.413 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 2.377 | | 2.093 | | 2.308 | | - | | 2.308 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 7.888 | | 9.860 | | 12.381 | | - | | 12.381 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>3406 / *Attack and Utility Replacement Aircraft* |




*2020DON - 0604212N - 3406*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604212N / *Other Helicopter Development* | **Project (Number/Name)**<br>3406 / *Attack and Utility Replacement Aircraft* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Attack and Utility Replacement Aircraft*** | | | | |
| Acquisition Milestones: Milestone A Phase: Schedule Detail | 3 | 2018 | 4 | 2021 |
| Acquisition Milestones: Milestone A Phase: Milestone A Award | 1 | 2022 | 1 | 2022 |
| Acquisition Milestones: Request for Proposal: Schedule Detail | 1 | 2022 | 2 | 2023 |
| Acquisition Milestones: Request for Proposal: Technical Maturation Risk Reduction (TMRR) Award | 3 | 2023 | 3 | 2023 |
| Systems Development: Preliminary Design: Schedule Detail | 3 | 2023 | 4 | 2024 |
| Systems Development: Supplier Requirements Derivation: Schedule Detail | 3 | 2023 | 1 | 2024 |
| Systems Development: Supplier Requirements Derivation: SFR | 2 | 2024 | 2 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604214M *I AV-8B Aircraft - Engine Dev* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 460.370 | 0.000 | 46.363 | 27.441 | - | 27.441 | 23.646 | 16.772 | 17.050 | 17.384 | Continuing | Continuing |
| 0652: *AV-8B* | 460.370 | 0.000 | 46.363 | 27.441 | - | 27.441 | 23.646 | 16.772 | 17.050 | 17.384 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The program provides for AV-8B Design, Development, Integration, and Test of various platform improvements such as: Engine Life Management Program (ELMP), Escape Systems, Joint Mission Planning System (JMPS), and Block upgrades to various mission systems and software Operational Flight Programs (OFPs) to include JMPS integration, avionics and communications systems, navigation equipment, weapons carriage and countermeasures, studies and analyses of future capability expansion and unique flight testing, and the Obsolescence Replacement (OR)/Readiness Management Plan (RMP) including structural, hydraulic, electrical, environmental, and mechanical systems. OR/RMP represents all engineering activities for development and design to support aircraft safety flight clearances, concept explorations, responses to evolving threats, and developments to support Program Objective Memorandum.

The program's Evolutionary Acquisition Strategy includes Design, Development, Integration, and Test activities under the consolidated effort of Block Developments: H6.2 and follow-on block upgrades, to include a H7.0 block upgrade that will be required to implement full Link 16 capability, provide weapon improvements and integrate AIM-9X and Joint Standoff Weapon (JSOW). An H6.2 update, included the Common Avionics Program, provided AV-8B a self-contained Global Positioning System navigation capability that is required to access preferred airspaces, and included a Litening OFP V3, and initial Link 16 Precise Participant Location and Identification capability, which provided interoperability, digital combat identification and increased situational awareness on the battlefield. Link 16 is a Top 10 item in the Operational Advisory and Systems Safety Groups. The H7.0 OFP will fully implement the Harrier Link 16 integration, which will provide information sharing capabilities and integration of an increased number of Link 16 J-series messages and the ability to act on shared target track information. Connection to the Link 16 network is vital to the AV-8B's ability to operate within some Command and Control situations and Operational Plans, as designed today, as well as provide a tactical capability for the more effective and safe prosecution of both airborne and ground targets. Continued AV-8B combat relevance and ability to respond to evolving and emergent threats through end of service is critical to the Marine Air-Ground Task Force's ability to generate aviation combat power throughout the transition to F-35B. J-series, K-series, Tactical Targeting Network Technology, and other emerging datalink technology messages are required to support current and future mission threads. Linked performance on par with current tactical platforms as well as design to communicate with F-35 is required for the AV-8B to remain tactically relevant to transition. H7.0 will also include the integration and test of weapons and sensors such as, but not limited to, AIM-9X, JSOW and Litening OFP V4, and will integrate required Display Computer processing improvements to enable H7.0 functionality. Integration of these weapons is vital to the Harrier's continued combat relevance to the Marine Expeditionary Unit and Global Response Force Combatant Commanders particularly as obsolete AIM-9M inventory dwindles.

Additionally, software integration and stores expansion testing will be required for systems to include a Helmet Mounted Cueing System (HMCS), Unique Weapons, survivability and Countermeasures, Advanced Precision Kill Weapons System (APKWS), AIM-9X, ALE-43, survivability upgrades, standoff weapons such as JSOW, Joint Air-to-Ground Missile (JAGM) and AIM-120 unique platform flight test which will be required to utilize updated AIM-120C variants on the AV-8B as well as test of emergent tactical requirements. AV-8B funding also supports peculiar flight test requirements to include weapons integration/carriage and avionics and software/ firmware upgrades. Studies and analyses will be conducted on systems such as survivability systems, HMCS and Beyond Line of Sight (BLOS) to assess feasibility of integrating on the AV-8B. The ELMP is a comprehensive plan to increase and maintain safety of flight and operational readiness of the AV-8B F402-RR-408 Engine

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604214M *I AV-8B Aircraft - Engine Dev* |

and accessories. The program will accomplish this mission by conducting Engineering Project Description investigations to develop engineering solutions that address emergent safety, obsolescence, foreign object debris detection and prevention, fatigue life and maintenance issues. The OR/RMP is required to ensure the AV-8B air vehicle's sustained mission availability, and safe and reliable operational readiness until end of service. Air vehicle sustainment requires component and system analyses, technical planning, identification, prioritization, and diagnosis of emergent problems and the allocation of resources for the development, testing and flight clearance of engineering solutions in the areas of flight, crew safety, and escape systems and structural integrity, obsolescence, systems reliability and maintainability, inventory preservation, alternative mission development, or other emergent material or equipment conditions affecting AV-8B systems readiness. Activities include research/analysis for system safety deficiency corrections, fuel system safety improvements, structural analyses, monitoring and integrity analysis, component compatibility, component and materials obsolescence analyses and mitigation development, explorations for aging equipment, reliability improvement analyses and design developments.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 46.363 | 38.735 | - | 38.735 |
| Current President's Budget | 0.000 | 46.363 | 27.441 | - | 27.441 |
| Total Adjustments | 0.000 | 0.000 | -11.294 | - | -11.294 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | -11.305 | - | -11.305 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.011 | - | 0.011 |

**Change Summary Explanation**

Funds were realigned in FY 2019 from PE 0604214N to PE 0604214M.

The FY 2020 funding request was reduced by $4.110 million to account for the availability of prior year execution balances.

FY 2020 funding decrease due to evolution of H7.0 OFP into the test phase and preparing for FY 2021 fielding. AIM-9X test asset procurement is complete and Original Equipment Manufacturer (OEM) involvement decreases as peculiar test flights are completed. Studies and analyses decrease as future efforts studies complete and inform future integration plans and decisions to ensure future capabilities such as HMCS, BLOS and survivability upgrades are feasible and integration approach is analyzed. Decrease in FY 2020 due to completion of the planning phase of the Fatigue Destructive Teardown Assessment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0652: *AV-8B* | 460.370 | 0.000 | 46.363 | 27.441 | - | 27.441 | 23.646 | 16.772 | 17.050 | 17.384 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program provides for AV-8B Design, Development, Integration and Test of the following improvements: Engine Life Management Program (ELMP), Operational Flight Programs (OFPs) and Avionics/Weapons Integration, Escape System, and Readiness Management Plan (RMP). The ELMP is a comprehensive plan to increase safety of flight and operational readiness of the AV-8B F402-RR-408 Engine and Gas Turbine Starter (GTS), as well as other critical engine components. The Program Office will accomplish this mission through the Component Improvement Program (CIP), which entails Engineering Project Description investigations to derive safety and reliability improvements to the engine and engine components. H6.2 provided Global Positioning System navigation capabilities, a Litening common OFP update and initial Link 16 capability to include use of the APX-123, initial Mode 5 capability, as well as software updates and cryptographic modernization. H7.0 OFP will integrate full Harrier Link 16 capability, provide software updates, integrate AIM-9X, a Litening Common OFP update, provide Advanced Precision Kill Weapons System (APKWS) integration improvements, Joint Standoff Weapon (JSOW) integration, and common avionics ADS-B (out), Mode 5, and Mode S Identification Friend or Foe capabilities as well as integrate required Radar Display Computer processing improvements to enable H7.0 functionality. Other efforts include peculiar integration and flight test requirements such as AIM-120C flight test, as AIM-120A/B will become obsolete, unique weapons, sensors, and countermeasures integration and stores expansion to include APKWS, Helmet Mounted Cueing System (HMCS), Beyond-Line-of-Sight (BLOS) communications, AIM-9X, ALE-43, standoff weapons such as JSOW, and unique flight test and study efforts of other avionics, sensors, or weapons systems , or emergent tactical requirements, as they arise. The program is working closely with the Common Avionics Program and the Allies (Spain and Italy) on all efforts. RMP represents all engineering activities for development, design and test to support aircraft safety, flight clearance and concept exploration for resolution of emergent safety, service life, escape systems, compatibility, obsolescence, and readiness issues as well as response to fleet urgent operational requirements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Development of RMP Engineering Change Proposals | 0.000 | 8.043 | 4.693 | 0.000 | 4.693 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop obsolescence solutions to improve safety, structural integrity, and systems reliability of the AV-8B aircraft. | | | | | |
| ***FY 2019 Plans:***<br>Extension of AV-8B End of Service date to 2028 requires continued obsolescence mitigation efforts to maintain aircraft readiness. The program will continue to address known, predicted, and emergent obsolescence equipment issues, continuing efforts from prior years. Continue fatigue life tracking analyses and algorithm update development. Continue Fuselage Fatigue Life Assessment and planning for a Fatigue Destructive Teardown Assessment to assure continued safe operation of the aircraft through the end of service date. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Systems engineering will support ongoing and emergent analysis and design/ development/test efforts required to identify Engineering Change Proposal (ECP) requirements to correct systems safety, structural integrity, compatibility, and readiness issues including efforts required to respond to evolving and emergent threats, mission systems, communications systems, navigation equipment, weapons carriage and countermeasures, structural, hydraulic, electrical, environmental, and mechanical systems.<br>***FY 2020 Base Plans:***<br>Extension of AV-8B End of Service date to 2028 requires continued obsolescence mitigation efforts to maintain aircraft readiness. The program will continue to address known, predicted, and emergent obsolescence equipment issues, continuing efforts from prior years. Continue fatigue life tracking analyses and algorithm update development. Continue Fuselage Fatigue Life Assessment to assure continued safe operation of the aircraft through the end of service date. Systems engineering will support ongoing and emergent analysis and design/ development/test efforts required to identify ECP requirements to correct systems safety, structural integrity, compatibility, and readiness issues including efforts required to respond to evolving and emergent threats, mission systems, communications systems, navigation equipment, weapons carriage and countermeasures, structural, hydraulic, electrical, environmental, and mechanical systems.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decrease due to completion of the planning for Fatigue Destructive Teardown Assessment. | | | | | |
| ***Title:*** Operational Flight Program (OFP) and Avionics Weapons Systems Development and Integration<br>***Articles:***<br>***Description:*** Develop, integrate, and test aircraft OFP updates, mission planning updates, Litening Pod software updates/capability expansions, support aircraft avionics development efforts, integrate and test unique weapons systems, sensors, and countermeasures such as AIM-120C, AIM-9X, HMCS, APKWS, BLOS Communications, Crypto Modernization activities, survivability upgrades, ALE-43, standoff weapons such as JSOW and other weapons/avionics and sensor systems and emergent tactical requirements as they arise, perform stores expansion testing, and conduct Digital Interoperability (to include Link 16) development, integration, and test efforts. Evaluate future capability expansions via studies and analyses.<br>***FY 2019 Plans:***<br>Funds provide for future capability expansion studies and analyses, efforts required to respond to evolving and emerging threats, peculiar flight test requirements to include various required weapons/sensors/ | 0.000<br>- | 32.388<br>- | 17.362<br>- | 0.000<br>- | 17.362<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| countermeasures/stores expansion integration and testing such as AIM-120, AIM-9X, ALE-43, JSOW, and other weapons/avionics systems as they arise. Funds will continue H7.0 OFP/Link 16/ AIM-9X/JSOW software development and integration and begin test efforts.<br>***FY 2020 Base Plans:***<br>Funds will provide for future capability expansion studies and analyses efforts to include HMCS, BLOS and survivability upgrades, future OFPs such as H8.0, efforts required to respond to evolving and emerging threats, peculiar flight test requirements to include various required weapons/sensors/countermeasures/crypto modernization/stores expansion integration and testing such as AIM-9X, ALE-43, JSOW, and other weapons/ avionics systems as they arise. Funds will also provide for continuation of H7.0 OFP/Link 16/ AIM-9X software integration and test efforts preparing for FY 2021 release.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decrease from FY 2019 to FY 2020 is due to evolution of H7.0 OFP software into the test phase, preparing for FY 2021 fielding. AIM-9X test asset procurement is complete and OEM involvement decreases as peculiar test flights are completed. Studies and analyses decrease as future efforts studies complete and inform future integration plans and decisions to ensure future capabilities such as HMCS, BLOS and survivability upgrades are feasible and integration approach is analyzed. | | | | | |
| ***Title:*** F402-RR-408 Engine Safety and Reliability Enhancements | 0.000 | 5.932 | 5.386 | 0.000 | 5.386 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Improve Safety and Reliability of the F402-RR-408 Engine and accessories for the AV-8B Harrier.<br>***FY 2019 Plans:***<br>The engineering CIP will conduct engineering investigations to develop ECPs for improvements and design solutions to correct deficiencies resulting from safety, obsolescence, FOD detection and prevention and structural fatigue for the engine and engine accessories, to maintain readiness and to meet mission requirements.<br>***FY 2020 Base Plans:***<br>The engineering CIP will conduct engineering investigations to develop ECPs for improvements and design solutions to correct deficiencies resulting from safety, obsolescence, FOD detection and prevention | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and structural fatigue for the engine and engine accessories, to maintain readiness and to meet mission requirements.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decrease from FY 2019 to FY 2020 is due to completion of redesign of the gas turbine starter bearings, an eighteen month effort beginning in FY 2018 and completing in FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 46.363 | 27.441 | 0.000 | 27.441 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0514: *AV-8 Series* | 41.762 | 58.577 | 39.472 | - | 39.472 | 33.774 | 32.273 | 38.445 | 39.208 | 125.055 | 1,783.276 |

**Remarks**

**D. Acquisition Strategy**

The Obsolescence Replacement (OR)/RMP ensures the maximum readiness levels for the AV-8B Type/Model/Series by maintaining post production engineering and logistic support with the Original Equipment Manufacturers (OEMs). RMP tracks readiness degraders, identifies and addresses obsolescence for non-avionics systems, and identifies and addresses emerging in-service material developments related to ease of maintenance, safety, airframe life management and improved performance. The multi-disciplined team of program management, engineering, logistics, and financial personnel develop Engineering Change Proposals (ECPs), Rapid Action Minor Engineering Changes, Interim Rapid Action Changes to publications, trainer and support equipment modifications necessary to maintain aircraft reliability and safety. The RMP additionally supports the constant improvement and analysis of fleet Fatigue Life Expended data to maximize aircraft structural life and to support the NAVAIR annual Structural Appraisal of Fatigue Effects report required by OPNAV, and structural fatigue life assessments to assure continued safe operation of the aircraft through the end of service date. Funding for the ELMP will be placed on a cost-type contract to Rolls-Royce to address safety of flight issues, top readiness degraders, engine removal and mission failure drivers in order to improve Fleet readiness and reduce cost of ownership of the F402-RR-408 and accessories. It is also developed to assess life management program issues and design fixes for any service revealed deficiencies. The program's Evolutionary Acquisition Strategy includes Design, Development, Integration, and Test activity under the consolidated effort of Block Developments: H2.0, H4.0, H5.0, H6.0, H6.1., H6.2, H7.0, and following OFPs. The H6.2 upgrade, accomplished in conjunction with the Common Avionics Program, provided a Global Positioning System Navigation capability for AV-8B, LITENING operational flight program update, initial Link 16 capability to include the use of APX-123 and initial Mode 5 functionality. The H7.0 OFP will provide the AV-8B integration of additional required Link 16 J-series messages, integration of AIM-9X and JSOW weapons, and APKWS integration updates. H7.0 will also be accomplished in conjunction with the Common Avionics Program and will integrate ADS-B (out), Mode 5, and Mode S capabilities. Peculiar flight test efforts to include weapons, avionics, survivability, and sensor integration such as AIM-120, AIM-9X, APKWS, ALE-43, ALR-67, HMCS, standoff weapons such as JSOW, other avionics/

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

weapons and sensor systems and emergent tactical requirements as they arise. Studies and analyses will be accomplished to assess future capability expansion feasibility and integration concepts to include weapons expansion, BLOS communications, survivability upgrades, and other potential avionics, weapons, or software capabilities as they arise.

**E. Performance Metrics**

Achieve Engine Life Management Program Rolls-Royce Component Improvement Program cost plus fixed fee, follow-on, contract award 1st Quarter FY 2020.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - ELMP | C/CPFF | Rolls-Royce PLC : Bristol, GB | 36.187 | 0.000 | | 1.963 | Dec 2018 | 1.976 | Dec 2019 | - | | 1.976 | 6.018 | 46.144 | 46.144 |
| Primary Hardware Development - ELMP | C/FFP | ONTIC (Goodrich) PS : Pitstone, GB | 6.881 | 0.000 | | 1.445 | Mar 2019 | 0.820 | Mar 2020 | - | | 0.820 | 1.380 | 10.526 | 10.526 |
| Primary Hardware Development - OFP | WR | NAWCWD : China Lake, CA | 71.061 | 0.000 | | 12.492 | Dec 2018 | 8.367 | Nov 2019 | - | | 8.367 | Continuing | Continuing | Continuing |
| Primary Hardware Development - OFP | C/FFP | Boeing : St. Louis, MO | 10.777 | 0.000 | | 3.100 | Dec 2018 | 1.691 | Dec 2019 | - | | 1.691 | 3.319 | 18.887 | 18.887 |
| Primary Hardware Development - OFP | C/CPFF | Raytheon : Waltham, MA | 4.450 | 0.000 | | 2.802 | Dec 2018 | 0.000 | | - | | 0.000 | 4.596 | 11.848 | 11.848 |
| Systems Engineering - RMP | C/FFP | Boeing : St. Louis, MO | 36.570 | 0.000 | | 1.466 | Jan 2019 | 1.038 | Jan 2020 | - | | 1.038 | 14.326 | 53.400 | 53.400 |
| Systems Engineering - RMP | WR | NAWCWD : China Lake, CA | 3.755 | 0.000 | | 0.096 | Nov 2018 | 0.098 | Nov 2019 | - | | 0.098 | Continuing | Continuing | Continuing |
| Systems Engineering - RMP | WR | NAWCAD : Patuxent River, MD | 9.238 | 0.000 | | 1.503 | Nov 2018 | 1.472 | Nov 2019 | - | | 1.472 | Continuing | Continuing | Continuing |
| Systems Engineering - OFP | WR | NAWCWD : China Lake, CA | 0.837 | 0.000 | | 0.502 | Nov 2018 | 0.500 | Nov 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| Systems Engineering - OFP | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 44.016 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 44.016 | - |
| | | **Subtotal** | 223.772 | 0.000 | | 25.369 | | 15.962 | | - | | 15.962 | Continuing | Continuing | N/A |

**Remarks**

Line 2: Decrease from FY19 to FY20 due to ONTIC completion of redesign of the gas turbine starter bearings.
Line 4: Decrease from FY19 to FY20 due to less OEM involvement as development completes and AIM-9X moves into developmental test.
Line 5: Decrease from FY19 to FY20 due to integration analysis effort now expected to complete in FY19 as AIM-9X planning has matured.
Line 6: Decrease from FY19 to FY20 due to decreased requirement for airframe structural and subcomponent improvement studies; safety and obsolescence studies will continue.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support - OFP | WR | FST Cherry Pt : Cherry Point, NC | 0.080 | 0.000 | | 0.100 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development - RMP | C/CPFF | Boeing : St. Louis, MO | 2.255 | 0.000 | | 0.616 | Jun 2019 | 0.628 | Jun 2020 | - | | 0.628 | 2.146 | 5.645 | 5.645 |
| Studies and Analysis - OFP | WR | NAWCWD : China Lake, CA | 0.881 | 0.000 | | 0.234 | Nov 2018 | 0.200 | Nov 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| Studies and Analysis - RMP | C/FFP | Boeing : St. Louis, MO | 4.962 | 0.000 | | 3.605 | Jul 2019 | 0.500 | Jul 2020 | - | | 0.500 | 3.090 | 12.157 | 12.157 |
| Studies and Analysis - OFP | C/FFP | Boeing : St. Louis, MO | 4.519 | 0.000 | | 2.147 | Jan 2019 | 0.239 | Jan 2020 | - | | 0.239 | 0.000 | 6.905 | 6.905 |
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 55.372 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 55.372 | - |
| | | **Subtotal** | 68.069 | 0.000 | | 6.702 | | 1.567 | | - | | 1.567 | Continuing | Continuing | N/A |

**Remarks**

Line 1: Decrease from FY19 to FY20 at FST Cherry Point because AIM-9X ILS effort will complete in FY19.
Line 4: Decrease from FY19 to FY20 due to completion in FY19 of the planning phase the Fatigue Destructive Teardown Assessment.
Line 5: Decrease from FY19 to FY20 due to decreased requirement for future capability studies.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation - RMP | WR | NAWCWD : China Lake, CA | 40.834 | 0.000 | | 0.259 | Jan 2019 | 0.301 | Jan 2020 | - | | 0.301 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation - OFP | WR | NAWCWD : China Lake, CA | 26.444 | 0.000 | | 6.841 | Jan 2019 | 3.957 | Jan 2020 | - | | 3.957 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation - OFP | C/CPFF | Raytheon : Waltham, MA | 1.971 | 0.000 | | 1.537 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.508 | 3.508 |
| Developmental Test & Evaluation - RMP | WR | FRC-E : Cherry Point, NC | 0.293 | 0.000 | | 0.100 | Dec 2018 | 0.200 | Nov 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation - RMP/OFP | Various | Various : Various | 0.100 | 0.000 | | 0.179 | Jan 2019 | 0.183 | Jan 2020 | - | | 0.183 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test & Evaluation - OFP | WR | COMOPTEVFOR : Norfolk, VA | 25.013 | 0.000 | | 0.707 | Jan 2019 | 0.721 | Jan 2020 | - | | 0.721 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation - OFP | WR | NAWCAD : Patuxent River, MD | 0.130 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 12.727 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.727 | - |
| | | **Subtotal** | 107.512 | 0.000 | | 9.623 | | 5.362 | | - | | 5.362 | Continuing | Continuing | N/A |

**Remarks**

Line 2: Decrease from FY19 to FY20 due to reduced scope of AIM-9X separation and captive integration testing as the effort progresses.
Line 3: Decrease from FY19 to FY20 due to test assets being procured from Raytheon in FY19 for software integration efforts.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering & Tec SRVC (Non-FFRDC) - RMP | C/CPFF | Amelex : California, MD | 1.301 | 0.000 | | 0.275 | Dec 2018 | 0.280 | Nov 2019 | - | | 0.280 | 0.867 | 2.723 | 2.723 |
| Engineering & Tec SRVC (Non-FFRDC) - ELMP | C/CPFF | LTM, Inc : Havelock, NC | 5.231 | 0.000 | | 1.331 | Jun 2019 | 1.379 | Jun 2020 | - | | 1.379 | 8.845 | 16.786 | 16.786 |
| Engineering & Tec SRVC (Non-FFRDC) | C/CPFF | Various : Various | 10.729 | 0.000 | | 0.208 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 10.937 | 10.937 |
| Government Engineering Support - ELMP | WR | NAWCAD : Patuxent River, MD | 10.055 | 0.000 | | 1.062 | Nov 2018 | 1.079 | Nov 2019 | - | | 1.079 | Continuing | Continuing | Continuing |
| Government Engineering Support - OFP | WR | NAWCAD : Patuxent River, MD | 4.104 | 0.000 | | 1.394 | Nov 2018 | 1.420 | Nov 2019 | - | | 1.420 | Continuing | Continuing | Continuing |
| Government Engineering Support - ELMP | WR | NAWCWD : China Lake, CA | 1.376 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Government Engineering Support - OFP | Various | Various : Various | 0.404 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| MGT & PROF SUPPT SRVC (NON-FFRDC) | C/CPFF | Various : Various | 9.248 | 0.000 | | 0.214 | Dec 2018 | 0.206 | Jan 2020 | - | | 0.206 | 12.064 | 21.732 | 21.732 |
| Travel | WR | Various : Various | 1.800 | 0.000 | | 0.185 | Oct 2018 | 0.186 | Oct 2019 | - | | 0.186 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 16.769 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 16.769 | - |
| | | **Subtotal** | 61.017 | 0.000 | | 4.669 | | 4.550 | | - | | 4.550 | Continuing | Continuing | N/A |

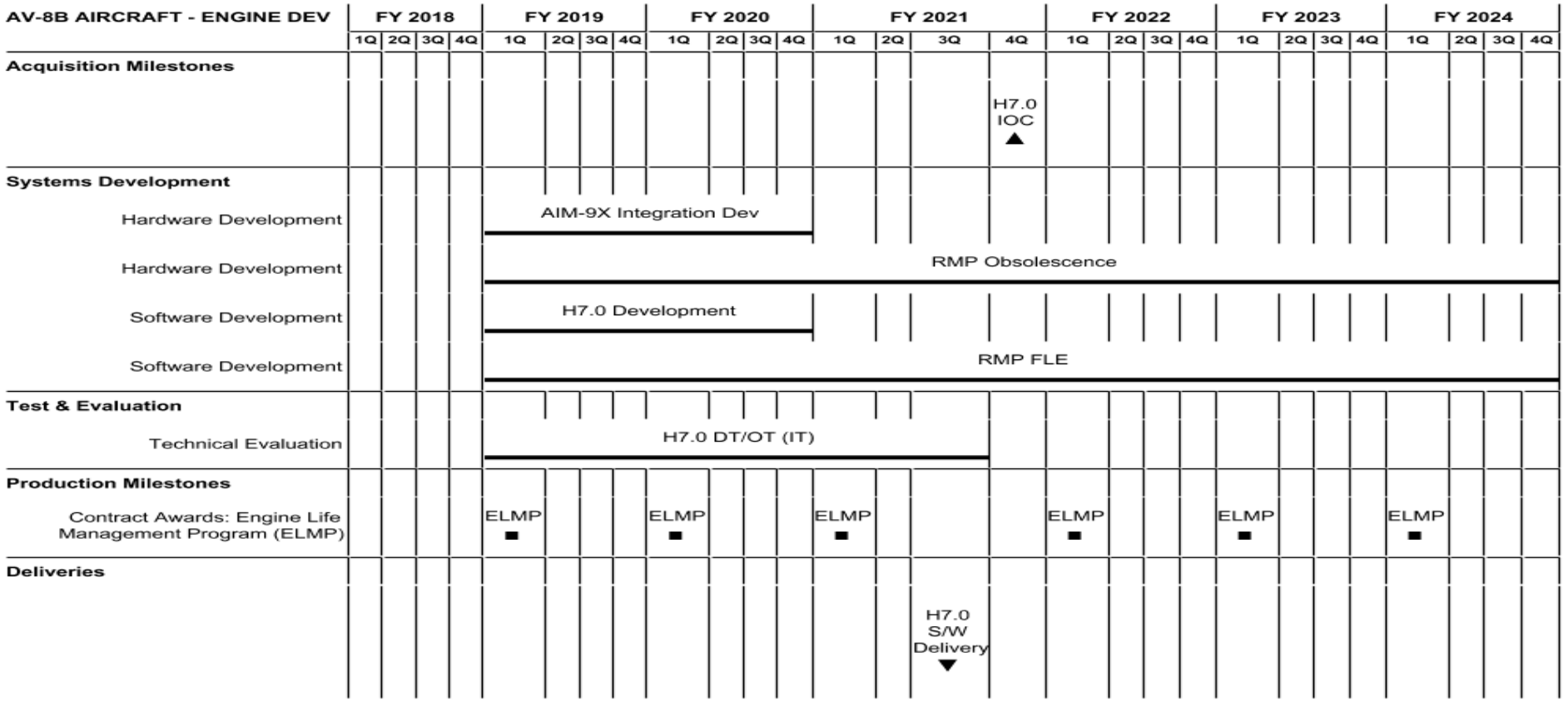
**Remarks**

Line 3: Decrease from FY19 to FY20 due to completion of Link 16 integration.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 460.370 | 0.000 | | 46.363 | | 27.441 | | - | | 27.441 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214M / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***AV-8B AIRCRAFT - ENGINE DEV*** | | | | |
| Acquisition Milestones: H7.0 IOC | 4 | 2021 | 4 | 2021 |
| Systems Development: Hardware Development: AIM-9X Integration Development | 1 | 2019 | 4 | 2020 |
| Systems Development: Hardware Development: RMP Obsolescence Development | 1 | 2019 | 4 | 2024 |
| Systems Development: Software Development: H7.0 Development | 1 | 2019 | 4 | 2020 |
| Systems Development: Software Development: RMP Fatigue Life Expended Development | 1 | 2019 | 4 | 2024 |
| Test & Evaluation: Technical Evaluation: H7.0 Link 16 DT/OT (IT) | 1 | 2019 | 3 | 2021 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY19 | 1 | 2019 | 1 | 2019 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY20 | 1 | 2020 | 1 | 2020 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY21 | 1 | 2021 | 1 | 2021 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY22 | 1 | 2022 | 1 | 2022 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY23 | 1 | 2023 | 1 | 2023 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY24 | 1 | 2024 | 1 | 2024 |
| Deliveries: H7.0 S/W Delivery | 3 | 2021 | 3 | 2021 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604214N *I AV-8B Aircraft - Engine Dev* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 411.590 | 41.261 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 452.851 |
| 0652: *AV-8B* | 411.590 | 41.261 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 452.851 |

**A. Mission Description and Budget Item Justification**

The program provides for AV-8B Design, Development, Integration, and Test of various platform improvements such as: Engine Life Management Program (ELMP), Escape Systems, Joint Mission Planning System (JMPS), and Block upgrades to various mission systems and software Operational Flight Programs (OFPs) to include JMPS integration, avionics and communications systems, navigation equipment, weapons carriage and countermeasures, studies and analyses of future capability expansion and unique flight testing, and the Obsolescence Replacement (OR)/Readiness Management Plan (RMP) including structural, hydraulic, electrical, environmental, and mechanical systems. OR/RMP represents all engineering activities for development and design to support aircraft safety flight clearances, concept explorations, responses to evolving threats, and developments to support Program Objective Memorandum. The program's Evolutionary Acquisition Strategy includes Design, Development, Integration, and Test activities under the consolidated effort of Block Developments: H6.2 and follow-on block upgrades, to include a H7.0 block upgrade that will be required to implement full Link 16 capability, provide weapon improvements and integrate AIM-9X and Joint Standoff Weapon (JSOW). An H6.2 update, included the Common Avionics Program, provided AV-8B a self-contained Global Positioning System navigation capability that is required to access preferred airspaces, and included a Litening OFP V3, and initial Link 16 Precise Participant Location and Identification capability, which provided interoperability, digital combat identification and increased situational awareness on the battlefield. Link 16 is a Top 10 item in the Operational Advisory and Systems Safety Groups. The H7.0 OFP will fully implement the Harrier Link 16 integration, which will provide information sharing capabilities and integration of an increased number of Link 16 J-series messages and the ability to act on shared target track information. Connection to the Link 16 network is vital to the AV-8B's ability to operate within some Command and Control situations and Operational Plans, as designed today, as well as provide a tactical capability for the more effective and safe prosecution of both airborne and ground targets. Continued AV-8B combat relevance and ability to respond to evolving and emergent threats through end of service is critical to the Marine Air-Ground Task Force's ability to generate aviation combat power throughout the transition to F-35B. J-series, K-series, Tactical Targeting Network Technology, and other emerging datalink technology messages are required to support current and future mission threads. Linked performance on par with current tactical platforms as well as design to communicate with F-35 is required for the AV-8B to remain tactically relevant to transition. H7.0 will also include the integration and test of weapons and sensors such as, but not limited to, AIM-9X, JSOW and Litening OFP V4, and will integrate required Display Computer processing improvements to enable H7.0 functionality. Integration of these weapons is vital to the Harrier's continued combat relevance to the Marine Expeditionary Unit and Global Response Force Combatant Commanders particularly as obsolete AIM-9M inventory dwindles. Additionally, software integration and stores expansion testing will be required for systems to include a Helmet Mounted Cueing System (HMCS), Unique Weapons, survivability and Countermeasures, Advanced Precision Kill Weapons System (APKWS), AIM-9X, ALE-43, survivability upgrades, standoff weapons such as JSOW, Joint Air-to-Ground Missile (JAGM) and AIM-120 unique platform flight test which will be required to utilize updated AIM-120C variants on the AV-8B as well as test of emergent tactical requirements. AV-8B funding also supports peculiar flight test requirements to include weapons integration/carriage and avionics and software/firmware upgrades. Studies and analyses will be conducted on systems such as survivability systems, HMCS and Beyond Line of Sight (BLOS) to assess feasibility of integrating on the AV-8B. The ELMP is a comprehensive plan to increase and maintain safety of flight and operational readiness of the AV-8B F402-RR-408 Engine and accessories. PMA-257 will accomplish this mission by conducting Engineering Project Description investigations to develop engineering solutions that address emergent safety, obsolescence, foreign object debris detection and prevention, fatigue life and maintenance issues. The OR/RMP is required to ensure the AV-8B air vehicle's sustained mission availability, and safe and reliable operational readiness until end of service. Air

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604214N *I AV-8B Aircraft - Engine Dev* |

vehicle sustainment requires component and system analyses, technical planning, identification, prioritization, and diagnosis of emergent problems and the allocation of resources for the development, testing and flight clearance of engineering solutions in the areas of flight, crew safety, and escape systems and structural integrity, obsolescence, systems reliability and maintainability, inventory preservation, alternative mission development, or other emergent material or equipment conditions affecting AV-8B systems readiness. Activities include research/analysis for system safety deficiency corrections, fuel system safety improvements, structural analyses, monitoring and integrity analysis, component compatibility, component and materials obsolescence analyses and mitigation development, explorations for aging equipment, reliability improvement analyses and design developments.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 48.780 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 41.261 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -7.519 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.837 | 0.000 | | | |
| • Congressional Directed Reductions Adjustments | -6.682 | - | - | - | - |

**Change Summary Explanation**

Funds decrease from FY 2018 to FY 2019 due to transfer of effort to new PE 0604214M beginning in FY 2019.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0652: *AV-8B* | 411.590 | 41.261 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 452.851 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program provides for AV-8B Design, Development, Integration and Test of the following improvements: Engine Life Management Program (ELMP), Operational Flight Programs (OFPs) and Avionics/Weapons Integration, Escape System, and Readiness Management Plan (RMP). The ELMP is a comprehensive plan to increase safety of flight and operational readiness of the AV-8B F402-RR-408 Engine and Gas Turbine Starter (GTS), as well as other critical engine components. The Program Office will accomplish this mission through the Component Improvement Program (CIP), which entails Engineering Project Description investigations to derive safety and reliability improvements to the engine and engine components. H6.2 provided Global Positioning System navigation capabilities, a Litening common OFP update and initial Link 16 capability to include use of the APX-123, initial Mode 5 capability, as well as software updates and cryptographic modernization. H7.0 OFP will integrate full Harrier Link 16 capability, provide software updates, integrate AIM-9X, a Litening Common OFP update, provide Advanced Precision Kill Weapons System (APKWS) integration improvements, Joint Standoff Weapon (JSOW) integration, and common avionics ADS-B (out), Mode 5, and Mode S Identification Friend or Foe capabilities as well as integrate required Radar Display Computer processing improvements to enable H7.0 functionality. Other efforts include peculiar integration and flight test requirements such as AIM-120C flight test, as AIM-120A/B will become obsolete, unique weapons, sensors, and countermeasures integration and stores expansion to include APKWS, Helmet Mounted Cueing System (HMCS), Beyond-Line-of-Sight (BLOS) communications, AIM-9X, ALE-43, standoff weapons such as JSOW, and unique flight test and study efforts of other avionics, sensors, or weapons systems , or emergent tactical requirements, as they arise. The program is working closely with the Common Avionics Program and the Allies (Spain and Italy) on all efforts. RMP represents all engineering activities for development, design and test to support aircraft safety, flight clearance and concept exploration for resolution of emergent safety, service life, escape systems, compatibility, obsolescence, and readiness issues as well as response to fleet urgent operational requirements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Development of RMP Engineering Change Proposals | 9.837 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop obsolescence solutions to improve safety, structural integrity, and systems reliability of the AV-8B aircraft. | | | | | |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Operational Flight Program (OFP) and Avionics Weapons Systems Development and Integration<br>***Articles:***<br><br>***Description:*** Develop, integrate, and test aircraft OFP updates, mission planning updates, Litening Pod software updates/capability expansions, support aircraft avionics development efforts, integrate and test unique weapons systems, sensors, and countermeasures such as AIM-120C, AIM-9X, HMCS, APKWS, BLOS Communications, Crypto Modernization activities, survivability upgrades, ALE-43, standoff weapons such as JSOW and other weapons/avionics and sensor systems and emergent tactical requirements as they arise, perform stores expansion testing, and conduct Digital Interoperability (to include Link 16) development, integration, and test efforts. Evaluate future capability expansions via studies and analyses.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A | 25.617<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** F402-RR-408 Engine Safety and Reliability Enhancements<br>***Articles:***<br><br>***Description:*** Improve Safety and Reliability of the F402-RR-408 Engine and accessories for the AV-8B Harrier.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A | 5.807<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 41.261 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0514: *AV-8 Series* | 41.762 | 58.577 | 39.472 | - | 39.472 | 33.774 | 32.273 | 38.445 | 39.208 | 125.055 | 1,783.276 |

**Remarks**

**D. Acquisition Strategy**

The Obsolescence Replacement (OR)/RMP ensures the maximum readiness levels for the AV-8B Type/Model/Series by maintaining post production engineering and logistic support with the Original Equipment Manufacturers (OEMs). RMP tracks readiness degraders, identifies and addresses obsolescence for non-avionics systems, and identifies and addresses emerging in-service material developments related to ease of maintenance, safety, airframe life management and improved performance. The multi-disciplined team of program management, engineering, logistics, and financial personnel develop Engineering Change Proposals (ECPs), Rapid Action Minor Engineering Changes, Interim Rapid Action Changes to publications, trainer and support equipment modifications necessary to maintain aircraft reliability and safety. The RMP additionally supports the constant improvement and analysis of fleet Fatigue Life Expended data to maximize aircraft structural life and to support the NAVAIR annual Structural Appraisal of Fatigue Effects report required by OPNAV, and structural fatigue life assessments to assure continued safe operation of the aircraft through the end of service date. Funding for the ELMP will be placed on a cost-type contract to Rolls-Royce to address safety of flight issues, top readiness degraders, engine removal and mission failure drivers in order to improve Fleet readiness and reduce cost of ownership of the F402-RR-408 and accessories. It is also developed to assess life management program issues and design fixes for any service revealed deficiencies. The program's Evolutionary Acquisition Strategy includes Design, Development, Integration, and Test activity under the consolidated effort of Block Developments: H2.0, H4.0, H5.0, H6.0, H6.1., H6.2, H7.0, and following OFPs. The H6.2 upgrade, accomplished in conjunction with the Common Avionics Program, provided a Global Positioning System Navigation capability for AV-8B, LITENING operational flight program update, initial Link 16 capability to include the use of APX-123 and initial Mode 5 functionality. The H7.0 OFP will provide the AV-8B integration of additional required Link 16 J-series messages, integration of AIM-9X and JSOW weapons, and APKWS integration updates. H7.0 will also be accomplished in conjunction with the Common Avionics Program and will integrate ADS-B (out), Mode 5, and Mode S capabilities. Peculiar flight test efforts to include weapons, avionics, survivability, and sensor integration such as AIM-120, AIM-9X, APKWS, ALE-43, ALR-67, HMCS, standoff weapons such as JSOW, other avionics/ weapons and sensor systems and emergent tactical requirements as they arise. Studies and analyses will be accomplished to assess future capability expansion feasibility and integration concepts to include weapons expansion, BLOS communications, survivability upgrades, and other potential avionics, weapons, or software capabilities as they arise.

**E. Performance Metrics**

Achieved Engine Life Management Program Rolls-Royce Component Improvement Program cost plus fixed fee contract award 1st Quarter FY 2018.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - ELMP | C/CPFF | Rolls-Royce PLC : Bristol, GB | 34.385 | 2.023 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 36.408 | 36.408 |
| Primary Hardware Development - ELMP | C/FFP | ONTIC (Goodrich) PS : Pitstone, GB | 6.281 | 1.034 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.315 | 7.315 |
| Primary Hardware Development - OFP | WR | NAWCWD : China Lake, CA | 57.009 | 8.870 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 65.879 | 65.879 |
| Primary Hardware Development - OFP | C/FFP | Boeing : St. Louis, MO | 7.777 | 1.568 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.345 | 9.345 |
| Primary Hardware Development - OFP | C/CPFF | Raytheon : Waltham, MA | 0.700 | 0.355 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.055 | 1.055 |
| Systems Engineering - RMP | C/FFP | Boeing : St. Louis, MO | 31.398 | 3.606 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 35.004 | 35.004 |
| Systems Engineering - RMP | WR | NAWCWD : China Lake, CA | 3.661 | 0.094 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.755 | - |
| Systems Engineering - RMP | WR | NAWCAD : Patuxent River, MD | 7.788 | 1.450 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.238 | - |
| Systems Engineering - OFP | WR | NAWCWD : China Lake, CA | 0.099 | 0.738 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.837 | - |
| Systems Engineering - OFP | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.051 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.051 | - |
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 43.965 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 43.965 | - |
| | | **Subtotal** | 193.063 | 19.789 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 212.852 | N/A |

**Remarks**

Line 1: FY18 increase from PB19 is due to increase in Foreign Object Damage (FOD) mitigation analysis effort.
Line 2: FY18 increase from PB19 is due to additional testing required for bearing redesign, repairs required on the test set and ONTIC overhead costs higher than the IGCE.
Line 3: FY18 decrease from PB19 is due to accomplishment of H7.0 detail planning and refinement of estimates.
Line 4: FY18 decrease from PB19 is due to completion of contract negotiations with Boeing.
Line 5: FY18 decrease from PB19 is due to completion of an engineering analysis which determined that AIM-9X integration requires a lower than planned level of Raytheon involvement due to Government decision to conduct post flight analysis in-house instead of at Raytheon.
Line 6: FY18 decrease from PB19 is due to final contract awards for various efforts lower than government estimates.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support - OFP | WR | FST Cherry Pt : Cherry Point, NC | 0.000 | 0.080 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.080 | - |
| Software Development - RMP | C/CPFF | Boeing : St. Louis, MO | 1.650 | 1.298 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.948 | 2.948 |
| Studies and Analysis - OFP | WR | NAWCWD : China Lake, CA | 0.649 | 0.232 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.881 | - |
| Studies and Analysis - RMP | C/FFP | Boeing : St. Louis, MO | 3.222 | 2.133 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.355 | 5.355 |
| Studies and Analysis - OFP | C/FFP | Boeing : St. Louis, MO | 3.519 | 2.520 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.039 | 6.039 |
| Prior year spt cost no longer funded in the FYDP | Various | Various : Various | 55.372 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 55.372 | - |
| | | **Subtotal** | 64.412 | 6.263 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 70.675 | N/A |

**Remarks**

Line 2: FY18 increase from PB19 is due to increased development cost of the Fatigue Life Expended tracking system which is an integral part of the AV-8B Service Life Assessment Program (SLAP).
Line 5: FY18 increase from PB19 is due to continuation of the Fuselage Fatigue Life Assessment effort including planning for a Destructive Teardown Assessment necessary to assure continued safe operation of the aircraft through the end of service date.
Line 6: FY18 increase from PB19 is due to increased requirement for feasibility study to implement BLOS capability to maintain operational relevance of the AV-8B through its remaining service life, to assess feasibility of future survivability upgrades and to assess feasibility of integrating a HMCS safely to achieve final fit capabilities designated for the AV-8B by the Deputy Commandant for Aviation.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation - RMP | WR | NAWCWD : China Lake, CA | 40.242 | 0.592 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 40.834 | - |
| Developmental Test & Evaluation - OFP | WR | NAWCWD : China Lake, CA | 19.899 | 6.545 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 26.444 | - |
| Developmental Test & Evaluation - OFP | C/CPFF | Boeing : St. Louis, MO | 1.439 | 0.360 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.799 | 1.799 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation - OFP | C/CPFF | Raytheon : Waltham, MA | 1.266 | 1.500 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.766 | 2.766 |
| Developmental Test & Evaluation - RMP | WR | FRC-E : Cherry Point, NC | 0.193 | 0.100 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.293 | - |
| Developmental Test & Evaluation - RMP/OFP | Various | Various : Various | 0.000 | 0.100 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Operational Test & Evaluation - OFP | WR | COMOPTEVFOR : Norfolk, VA | 24.250 | 0.762 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.012 | - |
| Operational Test & Evaluation - OFP | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.130 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.130 | - |
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 10.929 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.929 | - |
| | | **Subtotal** | 98.218 | 10.089 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 108.307 | N/A |

**Remarks**

Line 4: FY18 increase from PB19 is due to the requirement to procure HMCS systems to support peculiar testing to determine if a HMCS can be integrated safely and effectively on the AV-8B.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering & Tec SRVC (Non-FFRDC) - RMP | C/CPFF | Amelex : California, MD | 1.031 | 0.270 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.301 | 1.301 |
| Engineering & Tec SRVC (Non-FFRDC) - ELMP | C/CPFF | LTM, Inc : Havelock, NC | 4.069 | 1.162 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.231 | 5.231 |
| Engineering & Tec SRVC (Non-FFRDC) | C/CPFF | Various : Various | 9.688 | 1.041 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.729 | 10.729 |
| Government Engineering Support - ELMP | WR | NAWCAD : Patuxent River, MD | 9.003 | 1.052 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.055 | - |
| Government Engineering Support - OFP | WR | NAWCAD : Patuxent River, MD | 3.130 | 0.974 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.104 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | Project (Number/Name)<br>0652 / *AV-8B* | |

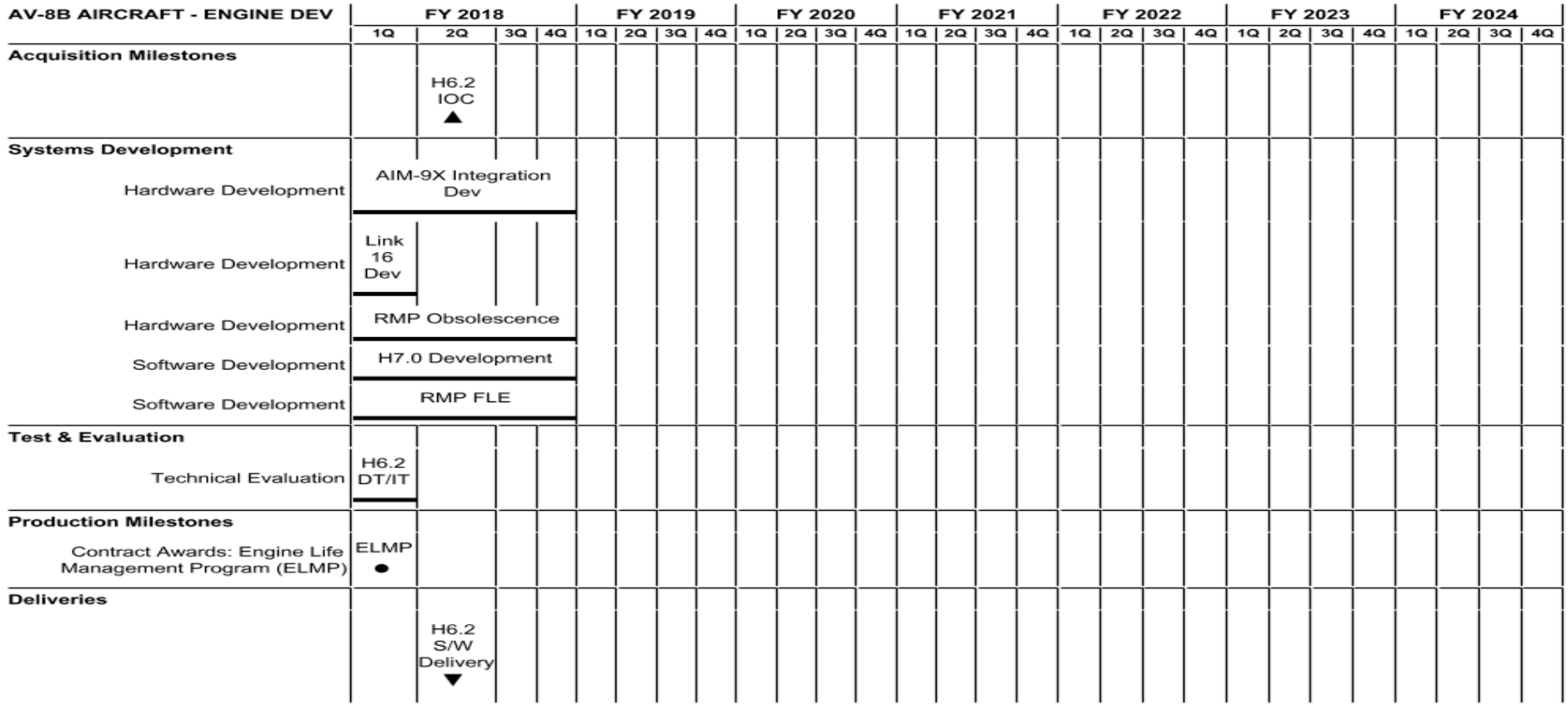
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support - ELMP | WR | NAWCWD : China Lake, CA | 1.348 | 0.028 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.376 | - |
| Government Engineering Support - OFP | Various | Various : Various | 0.200 | 0.204 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.404 | - |
| MGT & PROF SUPPT SRVC (NON-FFRDC) | C/CPFF | Various : Various | 9.039 | 0.209 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.248 | 9.248 |
| Travel | WR | Various : Various | 1.620 | 0.180 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.800 | - |
| Prior year cost no longer funded in the FYDP | Various | Various : Various | 16.769 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 16.769 | - |
| | | **Subtotal** | 55.897 | 5.120 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 61.017 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 411.590 | 41.261 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 452.851 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |




*2020DON - 0604214N - 0652*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604214N / *AV-8B Aircraft - Engine Dev* | **Project (Number/Name)**<br>0652 / *AV-8B* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***AV-8B AIRCRAFT - ENGINE DEV*** | | | | |
| Acquisition Milestones: H6.2 IOC | 2 | 2018 | 2 | 2018 |
| Systems Development: Hardware Development: AIM-9X Integration Development | 1 | 2018 | 4 | 2018 |
| Systems Development: Hardware Development: Link 16 Development | 1 | 2018 | 1 | 2018 |
| Systems Development: Hardware Development: RMP Obsolescence Development | 1 | 2018 | 4 | 2018 |
| Systems Development: Software Development: H7.0 Development | 1 | 2018 | 4 | 2018 |
| Systems Development: Software Development: RMP Fatigue Life Expended Development | 1 | 2018 | 4 | 2018 |
| Test & Evaluation: Technical Evaluation: H6.2 DT/IT | 1 | 2018 | 1 | 2018 |
| Production Milestones: Contract Awards: Engine Life Management Program (ELMP): ELMP Contract Award FY18 | 1 | 2018 | 1 | 2018 |
| Deliveries: H6.2 S/W Delivery | 2 | 2018 | 2 | 2018 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604215N / *Standards Development* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 17.099 | 2.711 | 3.771 | 3.642 | - | 3.642 | 4.160 | 4.275 | 4.361 | 4.449 | Continuing | Continuing |
| 1857: *Calibration Standards* | 17.099 | 2.711 | 3.771 | 3.642 | - | 3.642 | 4.160 | 4.275 | 4.361 | 4.449 | Continuing | Continuing |

**Note**

Starting in FY17 the Common Helicopters (PU 2312) and Stores Planning and Weaponeering Module (PU 2311) moved to Mission Planning PE (0605215N).
Starting in FY17 the JT Service/NV Std Avionics CP/SB (PU 0572) PE (0604215N) moved to a new Common Avionics PE (0605217N).

**A. Mission Description and Budget Item Justification**

This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Such air combat electronics developments include communications and airborne networking, navigation and sensors, flight avionics, safety systems, and flight mission information systems for both forward fit and retrofit aircraft. These efforts continue to maintain federated systems while encouraging transition of procurements to support a modular system for enhanced performance and affordability. Consideration is given up front to reduce acquisition costs through larger procurement quantities that satisfy multi-aircraft customer requirements and that reduce life cycle costs in the areas of reliability, maintainability, and training. This project also provides a Navy-wide program to develop required calibration standards (hardware) in all major measurement technology areas in support of Navy Hull, Mechanical and Electrical (HM&E) systems as well as Navy Weapons systems, ground and air, throughout the Fleet. It funds Navy lead-service responsibilities in the Department of Defense and Joint Services Metrology Research and Development program. This project supports the military requirement to verify the performance of all test systems used to validate the operation of HM&E as well as Navy Weapon Systems with calibration standards traceable to the National Institute of Standards and Technology.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604215N / *Standards Development* | | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 2.722 | 3.771 | 3.704 | - | 3.704 |
| Current President's Budget | 2.711 | 3.771 | 3.642 | - | 3.642 |
| Total Adjustments | -0.011 | 0.000 | -0.062 | - | -0.062 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.011 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.057 | - | -0.057 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.005 | - | -0.005 |

**Change Summary Explanation**

Technical: Change of 0.062 in FY20 due to program adjustment in the amount 0.057 and rate adjustment of 0.005.

0572:
Tactical Communications: Title corrected from Joint Precision Approach Landing System Software (S/W) Integration to Operation Flight Plan S/W Integration.

Ground Proximity Warning Systems/Terrain Awareness Warning System (GPWS/TAWS II): H-60 TAWS II Software Development extended duration from 4Q/15 through 4Q/16 based on projected platform integration schedule.

Military Flight Quality Assurance: Test and Evaluation, MH-53R/S, M/CH-53E, AH-1Z, UH-1Y, Phase 2 Test extended from 3Q/15 to 4Q/15 due to longer testing required for a number of defects found. Phase 2 Test Readiness Review moved from 1Q/15 to 3Q/15 due to integration test took longer than planned due to number of defects found. Deliveries for H-60R/S, CH-53E, AH-1Z and UH-1Y reflect new date of 2Q/15 to align with F/A-18 procurement order.

Mid Air Collision Avoidance Capability: Re-planned FY16-FY21 program as a result of the Business Case Analysis to properly aligned program. Material Development Decision/Acquisition Strategy Review (MDD/ASR) moved from 2Q/16 to 1Q/17. Added Capability Development Document (CDD) Draft added in 4Q16. Added Requirements Development from 1Q/16 to 4Q/16.

Starting in FY17 the JT Service/NV Std Avionics CP/SB (PU 0572) PE (0604215N) moved to a new Common Avionics PE (0605217N).

2311:
WASP V4.0 Systems Development start was delayed from 4Q16 to 2017 and will be displayed under PE 0605215N.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604215N *I Standards Development* |

WASP V3.2 IOC was delayed from 1Q16 to 3Q16 due to the asynchronous release process and requirement for a new build prior to IOC.

FY17 and out schedule is included in the Mission Planning PE 0605215N.

2312:
Common Helicopters schedule FY17 and out is included in Mission Planning PE 0605215N.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604215N / *Standards Development* | Project (Number/Name)<br>1857 / *Calibration Standards* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1857: *Calibration Standards* | 17.099 | 2.711 | 3.771 | 3.642 | - | 3.642 | 4.160 | 4.275 | 4.361 | 4.449 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Navy-wide program which addresses Metrology related RDT&E issues for navy weapon systems, shipboard platforms, Naval Air, and Fleet Ground Marines. It supports development of calibration standards (equipment, procedures and technical data) required to resolve Metcal related safety, obsolescence, new and emerging technology support and cost reduction issues. It funds Navy unique and lead service responsibilities in DoD and Joint Services Metrology Research Programs to develop calibration solutions. The line supports development of measurement requirements to verify performance of all test systems used to validate the operation of Navy Weapon Systems with calibration standards traceable to the National Institute of Standards and Technology to calibrate, sustain and ensure performance accuracy.

This program also provides benefits and efficiencies in a joint collaborative environment within the Tri-Services. Projects are identified and defined so that they will meet the universal requirement. Development efforts are integrated in order to achieve the common capabilities required at minimum cost. This is also a regular and common business practice within the Navy Metrology Community where R&D efforts are communicated and integrated into the multiple testing and Monitoring Systems. This is done in support of Program Managers, Sponsors, and Principle Executive officers. As a result, common requirements are established, duplication of efforts are eliminated, and best value, high quality Metcal products are produced for the Navy.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Calibration Standards | 2.711 | 3.771 | 3.642 | 0.000 | 3.642 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>($1.414) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing.<br><br>($.995) Begin development of (1) calibration hardware standards in electro optical (multimode) measurement and (1) high energy measurement technology standard to support shipboard readiness of weapon system communication to missile launch systems, combat Flight operations and ground combat operations.<br><br>($.660) Finish development and transition of (1) calibration hardware standard development in support of chemical and biological detection systems (chemical warfare agent detection systems) and begin development of (1) calibration hardware standard in support of laboratories that calibrate DLSS and SCBA pressure gauges. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604215N / *Standards Development* | **Project (Number/Name)**<br>1857 / *Calibration Standards* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ($.625) Finish development and transition (1) and continue development of (1) calibration standard in analytical and metrology benchtop technology to support equipment operational readiness for both air and sea-based operations.<br>***FY 2020 Base Plans:***<br>($1.375) Continue development of (1) calibration hardware standard in electrical/electronic measurement technology to support combat/operational readiness for submarine periscopes magnetic locks and aircraft tail hook non-destructive testing.<br><br>($1.153) Continue development of (2) calibration hardware standards in electro optical (Multi-mode) measurement technology and (1) high energy measurement technology standard to support shipboard readiness of weapon system communication to missile launch systems, combat Flight operations and ground combat operations.<br><br>($.494) Finish development and transition of (1) calibration hardware standard for Chemical/Biological technology to support shipboard and flight safety, and Divers Life Support Systems (DLSS).<br><br>($.620) Finish development and transition of (1) calibration standard in analytical and metrology benchtop technology to support equipment operational readiness for both air and sea-based operations.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>There was a decrease from FY2019 to FY 2020 of 0.129M in support of ship support balancer and rate/ miscellaneous adjustments. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.711 | 3.771 | 3.642 | 0.000 | 3.642 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Funds provide for in-service engineering initiation of metrology research and developmental efforts of unique non-commercial hardware standards in the development of six key thrust technological areas which correspond to Physical Mechanical, Electro-Optical, Analytical Metrology, Electrical/Electronic systems, Chembio Defense,

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604215N / *Standards Development* | **Project (Number/Name)**<br>1857 / *Calibration Standards* |

Microwave/Millimeter wave. These standards will ensure measurement accuracy in advanced and emerging combat weapon systems and associated test equipment. These hardware test standards will also provide for cost effective and efficient system maintenance and calibration measurements that reduce wrong test decisions and will result in lower maintenance cost and higher system performance reliability.

**E. Performance Metrics**

The U.S. Navy Metrology RDT&E Program will transition and continue the research and development of 9 projects in progress of Electro Optical, Chemical/Biological, Physical Mechanical, Analytical Metrology, Electrical/Electronic, and technology areas for the purpose of ensuring measurement accuracy in new emerging technology measurement requirements of Navy weapon systems. Success measures will be articulated through program goals and a balance score card strategy system.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604215N / *Standards Development* | Project (Number/Name)<br>1857 / *Calibration Standards* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NSWC Corona : Corona, CA | 5.462 | 0.048 | Mar 2018 | 0.281 | Mar 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 5.462 | 0.048 | | 0.281 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

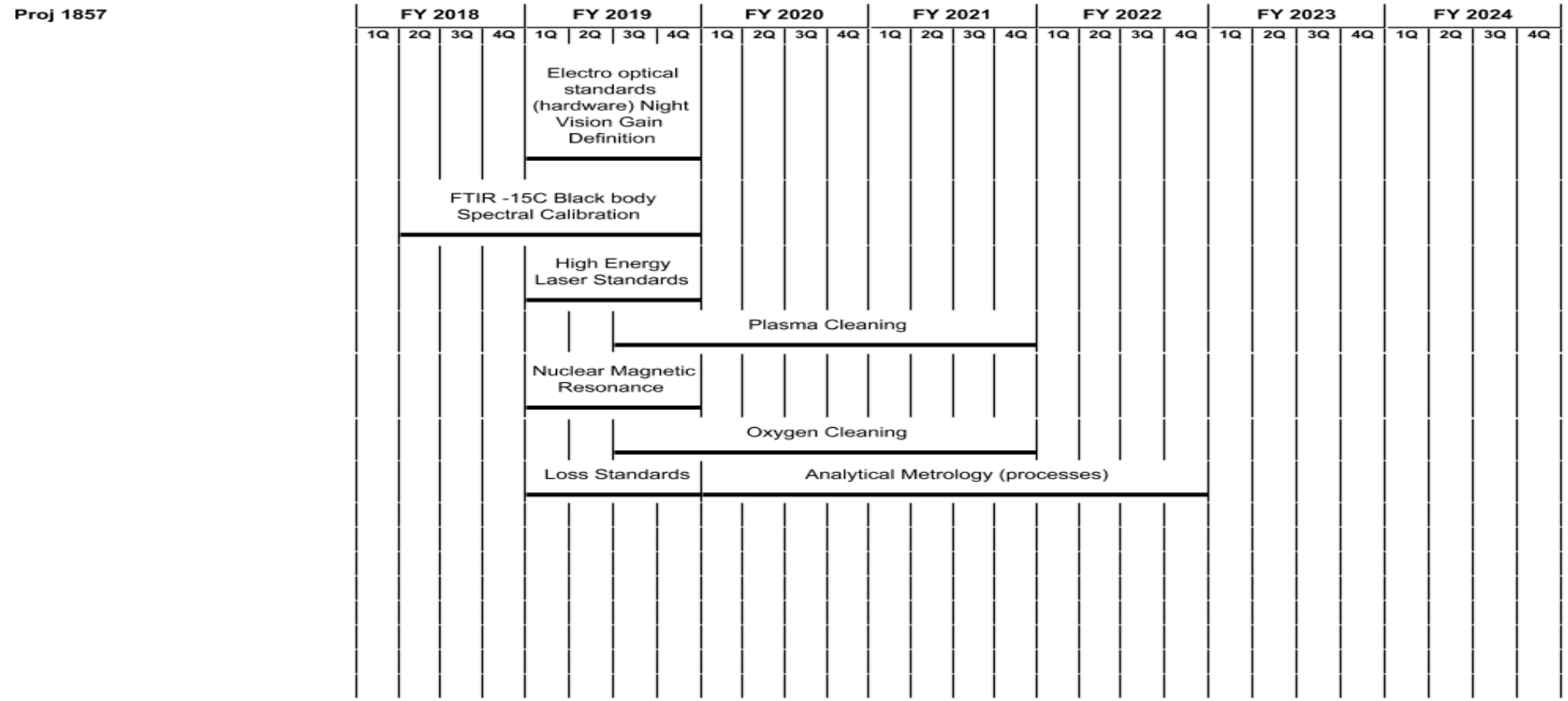
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | WR | NSWC Corona : Corona, CA | 2.514 | 0.571 | Mar 2018 | 0.353 | Mar 2019 | 1.375 | Mar 2020 | - | | 1.375 | 0.000 | 4.813 | - |
| Government Engineering Support | WR | NSWC Corona : Corona, CA | 8.891 | 0.776 | Mar 2018 | 3.102 | Mar 2019 | 1.153 | Mar 2020 | - | | 1.153 | 0.000 | 13.922 | - |
| Defense Acquisition Workforce | Various | Various : Various | 0.007 | 0.475 | Oct 2017 | 0.000 | Mar 2019 | 0.494 | Mar 2020 | - | | 0.494 | 0.000 | 0.976 | - |
| Travel | WR | NSWC Corona : Corona, CA | 0.225 | 0.841 | Mar 2018 | 0.035 | Mar 2019 | 0.620 | Mar 2020 | - | | 0.620 | 0.000 | 1.721 | - |
| | | **Subtotal** | 11.637 | 2.663 | | 3.490 | | 3.642 | | - | | 3.642 | 0.000 | 21.432 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 17.099 | 2.711 | | 3.771 | | 3.642 | | - | | 3.642 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604215N / *Standards Development* | **Project (Number/Name)**<br>1857 / *Calibration Standards* |




*2020DON - 0604215N - 1857*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604215N / *Standards Development* | **Project (Number/Name)**<br>1857 / *Calibration Standards* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1857*** | | | | |
| Electro optical standards (hardware) Night Vision Gain Definition | 1 | 2019 | 4 | 2019 |
| Electro optical standards (hardware) FTIR -15C Black body Spectral Calibration | 2 | 2018 | 4 | 2019 |
| Electro optical Standards (hardware) development in High Energy Laser Standards | 1 | 2019 | 4 | 2019 |
| Physical Mechanical standards (hardware) development in Plasma Cleaning | 3 | 2019 | 4 | 2021 |
| Physical Mechanical standards (hardware) development in Nuclear Magnetic Resonance | 1 | 2019 | 4 | 2019 |
| Physical Mechanical standards (hardware) development in Oxygen Cleaning | 3 | 2019 | 4 | 2021 |
| Fiber Optic Return Loss Standards | 1 | 2019 | 4 | 2019 |
| Analytical Metrology (processes) Reliability Engineering Process Development for Initial Intervals | 1 | 2020 | 4 | 2022 |
| Schedule Detail | 1 | 2019 | 4 | 2023 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604216N *I Multi-Mssn Helicopter Upgrade Dev* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,577.792 | 5.313 | 16.611 | 19.196 | - | 19.196 | 21.244 | 21.415 | 21.988 | 21.987 | Continuing | Continuing |
| 1707: *MH-60 Development* | 1,577.792 | 5.313 | 16.611 | 19.196 | - | 19.196 | 21.244 | 21.415 | 21.988 | 21.987 | Continuing | Continuing |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 191 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

This Program Element includes funding for the development and improvement of MH-60R/S systems. MH-60R/S Multi-Mission helicopters provide both carrier and own-ship defense, and greatly expand the capability of surface platforms through employment of onboard sensors and weapons systems. The MH-60R/S fleet is nearly 600 aircraft strong and serves as the world's premier multi-mission helicopter force. The MH-60R provides warfighting effectiveness in the primary mission areas of Anti-Submarine Warfare, Electronic Warfare, and Surface Warfare, including Fast Attack Craft/Fast In-shore Attack Craft (FAC/FIAC) threat response. Secondary MH-60R mission areas include search and rescue, vertical replenishment, naval surface fire support, logistics support, naval special warfare, strike warfare, personnel transport, and medical evacuation. The basic MH-60S conducts search and rescue, vertical replenishment, and logistics operations. Armed Helicopter and Airborne Mine Countermeasures (AMCM) have been added as primary mission areas for the MH-60S as block upgrades to the platform. Armed Helicopter upgrades provide Surface Warfare and Maritime Interdiction Operations capabilities to address FAC/FIAC threat, as well as Special Warfare Support and Combat Search and Rescue. AMCM provides the Littoral Combat Ship with the airborne portion of the Mine Countermeasures Mission Package. MH-60S secondary roles include torpedo and drone recovery, noncombatant evacuation operations, and SEAL team and Explosive Ordnance Disposal support.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 5.371 | 16.611 | 21.402 | - | 21.402 |
| Current President's Budget | 5.313 | 16.611 | 19.196 | - | 19.196 |
| Total Adjustments | -0.058 | 0.000 | -2.206 | - | -2.206 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.058 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -2.151 | - | -2.151 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.055 | - | -0.055 |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $1.061 million to account for the availability of prior year execution balances.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604216N *I Multi-Mssn Helicopter Upgrade Dev* |

FY 2020 funding was reduced due to refined cost estimate and schedule for the Network Enabled Weapons effort.

Schedule: Added Minotaur development and ALFS and ESM obsolescence efforts and lengthened development timeline for Network Enabled Weapons, common ASE architecture and System Configuration (SC) 18. SC20 start date changed from 1QFY2019 to 3QFY2019 and end date extended from 4QFY2020 to 4QFY2021 due to SC18 completion and changes to the scope of the development effort.

Technical: Not Applicable

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | Project (Number/Name)<br>1707 / *MH-60 Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1707: *MH-60 Development* | 1,577.792 | 5.313 | 16.611 | 19.196 | - | 19.196 | 21.244 | 21.415 | 21.988 | 21.987 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 191

**A. Mission Description and Budget Item Justification**

The MH-60R/S program pursues upgrades and enhancements that pace the rapidly evolving threat and improve safety-of-flight for its pilots and aircrew. These efforts include improvements to existing sensors, avionics, communications, and navigation systems to include Identification Friend or Foe (IFF), the Multi-spectral Targeting System (MTS), the MH-60R radar equipped with Automatic Radar Periscope Detection and Discrimination (ARPDD), integration of the Joint Air-to-Ground Missile (obsolescence follow-on for Hellfire), the Sensor Operator Console, and MH-60R data-fusion capability. The program is also making incremental improvements to various airframe, flight safety, and mission-planning systems. Very High Frequency Omni Ranging (VOR)/Instrument Landing System (ILS), on schedule be installed on MH-60R aircraft commencing in FY 2019, adds precision approach and airways-navigation capability to the MH-60R, and it greatly expands crews' ability to navigate in adverse weather. MH-60R is the lead platform for integration of the Multifunctional Information Distribution System (MIDS) / Low Volume Terminal (LVT) Block Upgrade 2 (an FAA and NSA mandate). MH-60R/S research and development initiatives include the evaluation and validation of the platform's cybersecurity posture. The MH-60R/S program is pursuing capability studies on open hardware and software architectures, avionics, mission systems, and air-vehicle kinematic performance. The program is also pursuing efforts in support of the MH-60 Mid-Life Upgrade.

FY 2020 budget request funds the following:
1. System Configuration 20 capability increases, including fuel management and safety, Advanced Offboard Electronic Warfare, and Multifunctional Information Distribution System Block Upgrade 2.
2. Development of critical aircraft survivability equipment upgrades, including the platform design for the integration of Distributed Aperture Infrared Counter Measures (DAIRCM). DAIRCM substantially improves the survivability of MH-60 aircraft, significantly enhancing the defense of high value units and enabling operations in high threat scenarios.
3. Development of Network Enabled Weapons capability, including the integration of J11 and J12.6 series messages within the MH-60 Link-16 architecture. These messages enable over-the-horizon targeting, enhance target sorting, and serve as a force multiplier in network enabled weapon engagements.
4. Initial requirements and architecture development for the integration of Minotaur mission management software. Minotaur is designed to increase track accuracy and provide cuing and improved displays to decrease operator workload.
5. Diminishing Manufacturing Sources and Material Shortages (DMSMS) engineering, replacement part development, and qualification testing for known and forecasted Airborne Low Frequency Sonar (ALFS) obsolete parts. These DMSMS solutions will provide considerations for cost reduction and improvement in reliability and performance. The obsolescence solutions will align with the Future Capabilities Roadmap to minimize duplication and align the Mid-Life Upgrade configuration changes with the needed solutions.
6. Developmental activities including capability studies, interoperability studies, and open hardware and software architectures definition in support of MH-60 Mid-Life Upgrade.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | **Project (Number/Name)**<br>1707 / *MH-60 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Avionics H/W and S/W Development | 2.286 | 9.010 | 16.339 | 0.000 | 16.339 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Development efforts support aircraft integration, problem investigation, lab management and upgrades, and repairs in support of the test program. Avionics hardware and software development and integration to include: Pre-planned Product Improvements, new system configurations, radar enhancements, VOR/ILS, solutions to address the FAC/FIAC threat, development of Network Enabled Weapons capability which includes the integration of J11 and J12.6 series messages into the MH-60R/S Link-16 architecture, development of critical Aircraft Survivability Equipment (ASE) upgrades, cyber evaluations/validations, DMSMS solutions, Minotaur integration, and system configuration enhancements.<br><br>***FY 2019 Plans:***<br>Complete VOR/ILS and commence activities for System Configuration 20 development which includes capability improvements for fuel management and safety, Advanced Offboard Electronic Warfare, and Multifunctional Information Distribution System Block Upgrade 2. Commence activities and award contract for the development of J11 and J12.6 series messages for network enabled weapon support, ASE upgrades, cyber evaluation/ validation activities and radar enhancements.<br><br>***FY 2020 Base Plans:***<br>Continue System Configuration 20 development which includes capability improvements for fuel management and safety, Advanced Offboard Electronic Warfare, and Multifunctional Information Distribution System Block Upgrade 2. Continue development of J11 and J12.6 series messages and operator controls for Network Enabled Messages. Commence activities for System Configuration 2X development which includes integration of Distributed Aperture Infrared Countermeasures system to improve survivability, and Minotaur mission management suite. Commence development efforts and define requirements for ALFS DMSMS solutions considering reliability improvement, loading factors, weight and cost reduction, capability and performance improvements, etc. Continue cyber evaluation and radar development efforts.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $7.329M from FY 2019 to FY 2020 for System Configuration 2X, Minotaur development, radar development, and ALFS DMSMS solutions. | | | | | |
| ***Title:*** Engineering and Logistics | 1.792 | 2.650 | 2.485 | 0.000 | 2.485 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | **Project (Number/Name)**<br>1707 / *MH-60 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to provide MH-60 engineering support, integrated logistics support, government furnished equipment, support equipment, program management, contract support services, and travel to support Mid-Life Upgrade capability studies and initial open architectures, avionics, mission system, and air vehicle development cost and schedule planning estimates.<br>This includes performing high-time aircraft teardowns and fatigue life research. Commence engineering support, integrated logistics support, government furnished equipment, support equipment, program management, contract support services, and travel to support System Configuration 20, ASE Common Architecture development and contract preparation, Network Enabled Weapons contract preparation and award, and radar enhancement efforts.<br>***FY 2020 Base Plans:***<br>Continue to provide MH-60 engineering support, integrated logistics support, government furnished equipment, support equipment, program management, contract support services, and travel to support System Configuration 20, ASE Common Architecture development, Network Enabled Weapons integration, radar development, Mid-Life Upgrade capability studies and initial open architectures, avionics, mission system, and air vehicle development cost and schedule planning estimates. Commence engineering support, integrated logistics support, government furnished equipment, support equipment, program management, contract support services, and travel to support System Configuration 2X, Distributed Aperture Infrared Countermeasures development and contract preparation, and Minotaur integration contract preparation and award. Commence DMSMS engineering support to develop and define requirements for ALFS obsolescence solutions that are form-fit-function.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $.165M from FY 2019 to FY 2020 due to the completion of System Configuration 18. | | | | | |
| ***Title:*** Test and Evaluation | 1.235 | 4.951 | 0.372 | 0.000 | 0.372 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | **Project (Number/Name)**<br>1707 / *MH-60 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete System Configuration 18 and MH-60R VOR/ILS test and evaluation efforts. Commence System Configuration 20 test support.<br>***FY 2020 Base Plans:***<br>Continue System Configuration 20 test support. Commence System Configuration 2X.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $4.579M from FY 2019 to FY 2020 due to System Configuration 20 and 2X cost sharing agreements with International partners. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 5.313 | 16.611 | 19.196 | 0.000 | 19.196 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN-5/0530: *SH60 Series* | 99.111 | 130.720 | 149.797 | - | 149.797 | 135.261 | 112.546 | 103.493 | 104.098 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

MH-60 research and development efforts will be developed using cost plus incentive fee type contracts.

**E. Performance Metrics**

Successfully support developmental and operation test activities to qualify aircraft modifications/upgrades.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | Project (Number/Name)<br>1707 / *MH-60 Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary SW Dev. Fast Attack Craft/Fast In-Shore Attack Craft (FAC/FIAC) demo | SS/BOA | Lockheed Martin : Owego, NY | 5.593 | 0.049 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.642 | 5.642 |
| Primary Hdw/SW Dev, Instrument Landing System | SS/CPFF | Lockheed Martin : Owego, NY | 1.249 | 0.627 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.876 | 1.876 |
| Primary Hdw/SW Dev, Instrument Landing System | SS/CPIF | Sikorsky : Stratford, CT | 1.808 | 0.592 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.400 | 2.400 |
| Primary HDW/SW Dev, Usage Spectrum Update | SS/CPIF | Sikorsky : Stratford, CT | 0.000 | 1.018 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.018 | 1.018 |
| Prior year Product Dev Cost no longer funded in the FYDP | Various | Various : Various | 1,165.791 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,165.791 | 1,165.791 |
| System Configuration 20 | SS/CPFF | Lockheed Martin : Owego, NY | 0.000 | 0.000 | | 0.110 | Dec 2018 | 0.100 | Dec 2019 | - | | 0.100 | Continuing | Continuing | Continuing |
| Primary Hdw Dev, Avionics FFFW | MIPR | Army, DOTC : Picatinny, NJ | 0.818 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.818 | 0.818 |
| Network Enabled Weapons | SS/CPFF | Lockheed Martin : Owego, NY | 0.000 | 0.000 | | 5.000 | Mar 2019 | 4.989 | Mar 2020 | - | | 4.989 | 6.011 | 16.000 | 16.000 |
| Cyber Evaluation/ Validation | TBD | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 0.600 | Jan 2019 | 1.300 | Jan 2020 | - | | 1.300 | 0.000 | 1.900 | 1.900 |
| Common ASE Architecture | SS/CPFF | Lockheed Martin : Owego, NY | 0.000 | 0.000 | | 3.000 | Apr 2019 | 1.800 | Apr 2020 | - | | 1.800 | 3.200 | 8.000 | 8.000 |
| Radar Development | TBD | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 0.300 | Jan 2019 | 2.000 | Jan 2020 | - | | 2.000 | 0.000 | 2.300 | 2.300 |
| ALFS DMSMS Solutions | SS/IDDQ | Raytheon : Portsmouth, RI | 0.000 | 0.000 | | 0.000 | | 3.150 | Jan 2020 | - | | 3.150 | 27.220 | 30.370 | 30.370 |
| System Configuration 2X | SS/CPFF | Lockheed Martin : Owego, NY | 0.000 | 0.000 | | 0.000 | | 0.900 | Apr 2020 | - | | 0.900 | Continuing | Continuing | Continuing |
| Minotaur Development | SS/CPFF | Lockheed Martin : Owego, NY | 0.000 | 0.000 | | 0.000 | | 2.100 | Apr 2020 | - | | 2.100 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | **Project (Number/Name)**<br>1707 / *MH-60 Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 1,175.259 | 2.286 | | 9.010 | | 16.339 | | - | | 16.339 | Continuing | Continuing | N/A |

**Remarks**

Increase from FY 2019 to FY 2020 to support ramp-up of Net Enabled Weapons, Cyber Evaluation/Validation and Radar development efforts and commencement of ALFS DMSMS, System Configuration 2X and Minotaur development activities.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government eng spt, Very High Frequency Omni Ranging/Instrument Landing Sysem (VOR ILS) | Various | Various : Various | 0.568 | 0.340 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.908 | - |
| Government eng spt, Usage Spectrum Update | C/BA | TBD : TBD | 0.000 | 0.920 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.920 | - |
| Prior year support cost no longer funded in the FYDP | Various | Various : Various | 163.344 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 163.344 | - |
| MH-60S Forward Firing Weapons/Rockets Government Engineering Support | Various | Various : Various | 0.319 | 0.225 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.544 | - |
| Government Eng Support , System Configuration 18 | Various | Various : Various | 0.000 | 0.057 | Nov 2017 | 0.200 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.257 | - |
| Government Eng Support, Mid-Life Upgrade | Various | Various : Various | 0.000 | 0.200 | Nov 2017 | 0.600 | Nov 2018 | 0.447 | Nov 2019 | - | | 0.447 | 0.000 | 1.247 | - |
| Government Eng Support, System Configuration 20 | Various | Various : Various | 0.000 | 0.000 | | 0.250 | Nov 2018 | 0.070 | Nov 2019 | - | | 0.070 | Continuing | Continuing | Continuing |
| Government Eng Support, Net Enabled Weapons | Various | Various : Various | 0.000 | 0.000 | | 0.500 | Nov 2018 | 0.600 | Nov 2019 | - | | 0.600 | 0.150 | 1.250 | - |
| Government Eng Support, Common ASE Architecture | Various | Various : Various | 0.000 | 0.000 | | 0.750 | Nov 2018 | 0.750 | Nov 2019 | - | | 0.750 | 0.000 | 1.500 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | Project (Number/Name)<br>1707 / *MH-60 Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Eng Support, Radar Dev | Various | Various : Various | 0.000 | 0.000 | | 0.300 | Nov 2018 | 0.300 | Nov 2019 | - | | 0.300 | 0.000 | 0.600 | - |
| Government Eng Support, ALFS DMSMS | WR | NAWC AD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.118 | Nov 2019 | - | | 0.118 | Continuing | Continuing | Continuing |
| Government Eng Support, System Configuration 2X | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.150 | Nov 2019 | - | | 0.150 | 0.000 | 0.150 | - |
| | | **Subtotal** | 164.231 | 1.742 | | 2.600 | | 2.435 | | - | | 2.435 | Continuing | Continuing | N/A |

**Remarks**

Decrease from FY 2019 to FY 2020 due to the completion of System Configuration 18.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation (DT&E), Projects commencing prior to FY16 | WR | NAWC AD : Patuxent River, MD | 169.863 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 169.863 | - |
| Operation Test & Evaluation (OT&E),Projects commencing prior to FY16 | WR | COMOPTEVFOR : Norfolk, VA | 15.451 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.451 | - |
| Developmental Test & Evaluation (DT&E), Very High Frequency Omni Ranging (VOR)/Instrument Landing System (ILS) | WR | NAWC AD : Patuxent River, MD | 0.036 | 0.020 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.056 | - |
| Prior year T&E costs no longer funded in the FYDP | Various | various : various | 12.280 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.280 | - |
| DT&E, System Configuration 18 | Various | Various : Various | 0.000 | 1.165 | Nov 2017 | 0.800 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.965 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | Project (Number/Name)<br>1707 / *MH-60 Development* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT&E, MH-60S FFFW/ Rockets | Various | Various : Various | 1.413 | 0.050 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.463 | - |
| DT&E, System Configuration 20 | WR | NAWC AD : Patuxent River, MD | 0.000 | 0.000 | | 4.151 | Nov 2018 | 0.200 | Nov 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| DT&E, ALFS DMSMS | WR | NAWC AD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.119 | Nov 2019 | - | | 0.119 | Continuing | Continuing | Continuing |
| DT&E, System Configuration 2X | WR | NAWC AD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.053 | Nov 2019 | - | | 0.053 | 0.000 | 0.053 | - |
| | | **Subtotal** | 199.043 | 1.235 | | 4.951 | | 0.372 | | - | | 0.372 | Continuing | Continuing | N/A |

**Remarks**

NAWCAD decrease from FY 2019 to FY 2020 due to System Configuration 20 and 2X cost sharing agreements with International partners.

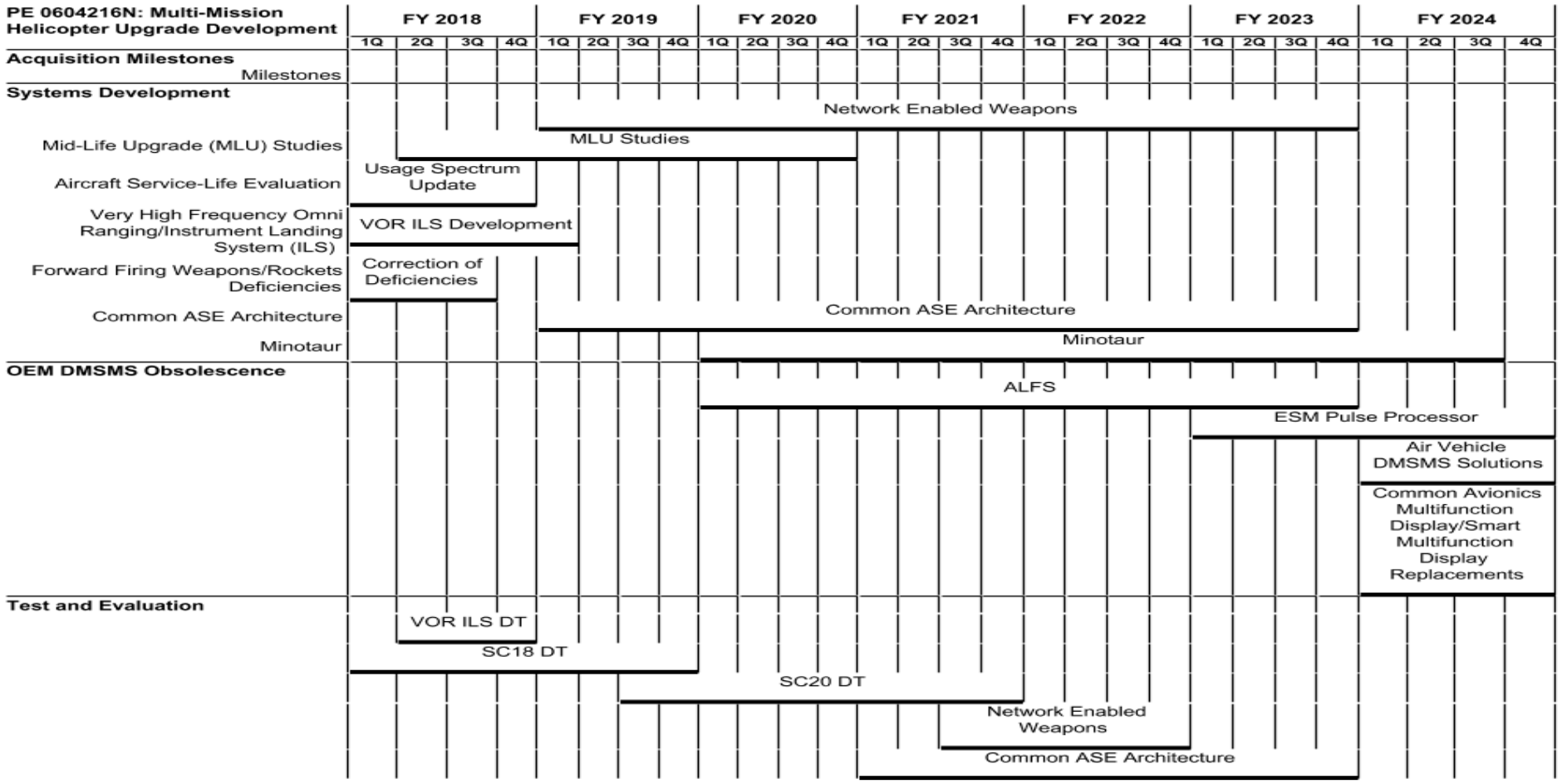
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | NAWC AD : Patuxent River, MD | 5.003 | 0.050 | Nov 2017 | 0.050 | Oct 2018 | 0.050 | Oct 2019 | - | | 0.050 | 0.174 | 5.327 | - |
| Prior year Mgmt Serv cost no longer funded in the FYDP | Various | Various : Various | 34.256 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 34.256 | - |
| | | **Subtotal** | 39.259 | 0.050 | | 0.050 | | 0.050 | | - | | 0.050 | 0.174 | 39.583 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,577.792 | 5.313 | | 16.611 | | 19.196 | | - | | 19.196 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | **Project (Number/Name)**<br>1707 / *MH-60 Development* |




2020PB - 0604216N - 1707

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604216N / *Multi-Mssn Helicopter Upgrade Dev* | **Project (Number/Name)**<br>1707 / *MH-60 Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***PE 0604216N: Multi-Mission Helicopter Upgrade Development*** | | | | |
| Systems Development: Network Enabled Weapons | 1 | 2019 | 4 | 2023 |
| Systems Development: Mid-Life Upgrade (MLU) Studies: MLU Studies | 2 | 2018 | 4 | 2020 |
| Systems Development: Aircraft Service-Life Evaluation: Usage Spectrum Update | 1 | 2018 | 4 | 2018 |
| Systems Development: Very High Frequency Omni Ranging/Instrument Landing System (ILS): ILS integration | 1 | 2018 | 1 | 2019 |
| Systems Development: Forward Firing Weapons/Rockets Deficiencies: Correction of Deficiencies | 1 | 2018 | 3 | 2018 |
| Systems Development: Common ASE Architecture: Common ASE Architecture | 1 | 2019 | 4 | 2023 |
| Systems Development: Minotaur: Minotaur | 1 | 2020 | 3 | 2024 |
| OEM DMSMS Obsolescence: ALFS | 1 | 2020 | 4 | 2023 |
| OEM DMSMS Obsolescence: ESM Pulse Processor | 1 | 2023 | 4 | 2024 |
| OEM DMSMS Obsolescence: Air Vehicle DMSMS Solutions | 1 | 2024 | 4 | 2024 |
| OEM DMSMS Obsolescence: Common Avionics Multifunction Display/Smart Multifunction Display Replacements | 1 | 2024 | 4 | 2024 |
| Test and Evaluation: VOR ILS DT | 2 | 2018 | 4 | 2018 |
| Test and Evaluation: System Configuration 18 (SC18) | 1 | 2018 | 4 | 2019 |
| Test and Evaluation: System Configuration 20 (SC20) | 3 | 2019 | 4 | 2021 |
| Test and Evaluation: Integration and Testing of Network Enabled Weapons | 3 | 2021 | 4 | 2022 |
| Test and Evaluation: Integration and Testing of Common ASE Architecture | 1 | 2021 | 4 | 2023 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604218N *I Air/Ocean Equipment Engineering* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 64.609 | 5.583 | 15.582 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 85.774 |
| 2343: *Tactical METOC Applications* | 0.000 | 0.000 | 9.268 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.268 |
| 2345: *Fleet METOC Equipment* | 64.609 | 0.755 | 0.672 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 66.036 |
| 2363: *Remote Sensing Capability Development* | 0.000 | 0.000 | 5.642 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.642 |
| 9999: *Congressional Adds* | 0.000 | 4.828 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.828 |

**Note**

FY19 funding control for Tactical METOC Applications (2343) and Remote Sensing Capability Development (2363) was moved from Program Element (PE) 0603207N AIR/OCEAN TACTICAL APPLICATIONS to PE 0604218N AIR/OCEAN EQUIPMENT ENGINEERING as a result of a Budget Activity (BA) reclassification.

FY20 and out funding control for the following projects has been realigned out of PE 0604218N into PE 0604231N as part of Program Element Consolidation: Project 2343 Tactical METOC Applications, Project 2345 Fleet METOC Equipment, and Project 2363 Remote Sensing Capability Development.

**A. Mission Description and Budget Item Justification**

The Air/Ocean Equipment Engineering (AOEE) Program Element provides new capabilities to support naval combat forces. This program engineers and developmentally tests organic and remote sensors, communication interfaces, and processing and display devices. This equipment is engineered to measure, ingest, store, process, distribute and display conditions of the physical environment that are essential to the optimum employment and performance of naval warfare systems. AOEE also engineers capabilities for shipboard and shore-based tactical systems. A major area of focus for the AOEE program is to provide the engineering development of specialized equipment and measurement capabilities that are intended to monitor specific conditions of the physical environment in hostile and remote areas in response to fleet demand signals for increased sensing capability and capacity to support battlespace collections and prediction on short to intermediate time scales. With such capabilities, the war fighters' situational awareness of the operational effects of the physical environment are made more certain. Efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion.

Major emphasis areas include the Naval Integrated Tactical Environmental System Next Generation (NITES-Next)program, the Remote Sensing Capability Development (RSCD) project and Littoral Battlespace Sensors - Unmanned Undersea Vehicles (LBS-UUV).

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604218N *I Air/Ocean Equipment Engineering* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.782 | 17.368 | 22.433 | - | 22.433 |
| Current President's Budget | 5.583 | 15.582 | 0.000 | - | 0.000 |
| Total Adjustments | 4.801 | -1.786 | -22.433 | - | -22.433 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -1.786 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.199 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -21.563 | - | -21.563 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.870 | - | -0.870 |
| • Congressional Add Adjustments | 5.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Unmanned Systems in Maritime Environment* | 4.828 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 4.828 | 0.000 |
| Congressional Add Totals for all Projects | 4.828 | 0.000 |

**Change Summary Explanation**

FY19 to FY20 Change summaries are available under PE 0604231N for Projects 2343 Tactical METOC Applications, 2345 Fleet METOC Equipment and 2363 Remote Sensing Capability Development.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2343: *Tactical METOC Applications* | 0.000 | 0.000 | 9.268 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.268 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

FY19 funding control for Fleet Meteorology & Oceanography (METOC) Equipment (2343) was moved from Program Element (PE) 0603207N AIR/OCEAN TACTICAL APPLICATIONS to PE 0604218N AIR/OCEAN EQUIPMENT ENGINEERING as a result of a Budget Activity (BA) reclassification.

FY20 funding control and beyond has been realigned out of PE 0604218N Project 2343, into PE 0604231N Project 2343 as part of RDTEN PE Consolidation.

**A. Mission Description and Budget Item Justification**

The Tactical Meteorology and Oceanography (METOC) Applications Project provides cyber secure operational effects decision aid capabilities for Navy and Marine Corps warfighters in the context of Joint Operations in a net-centric environment. This project funds the agile software development of the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program of record. NITES-Next program identifies and transitions state-of-the-art decision support software technologies from the government and commercial industry's technology base, and then demonstrates and validates these capabilities before fielding. These software decision support tools provide platform, sensor, communications, and weapon systems performance assessments for warfighters in terms of their littoral and deep-strike battlespace environments. These assessments allow mission planners and warfighters, from Unit to Theater level, to optimize their sensor employment on airborne, surface, and subsurface platforms in support of Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), Expeditionary Warfare (EXW), Electronic Warfare (EW), Information Operations (IO), Intelligence Operations (INT), Non-Combat Operations (NCO), Command, Control, Communication (CCC), and Naval Special Warfare (NSW). Performance assessments leading to improvements in operational and tactical control are conducted through a two-tiered approach: 1) Meteorological and Oceanographic (METOC) Decision Aids and, 2) Operational Effects Decision Aids (OEDAs). METOC Decision Aides consist of a series of analysis tools which characterize the physical environment conditions of the battlespace based on the best set of physical environment data available at the time (i.e., some combination of historical and/or real-time (or near real-time) in-situ, and numerically modeled forecast data). OEDAs use the METOC Decision Aide information by fusing it with relevant, often-classified, sensor and target data to predict how weapons and sensor systems will perform. Performance results are displayed in tabular and graphic formats integrated into net-centric visualization tools for use by mission planners, and combat/weapon system operators to develop localization plans, USW/AAW/ASUW screens, STW profiles, and AMW ingress and egress points. METOC Decision Aides and OEDAs use data obtained through direct interfaces to Navy combat systems. Cyber secure capabilities are a current emphasis required to characterize and/or predict sensor and weapons system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses multi-warfare areas, particularly shallow water ASW, NSW, and missile and air defense/strike capabilities.

Funding supports development and integration efforts for Meteorological and Oceanographic (METOC) systems to generate and collect METOC data and fuse multiple intelligence inputs to more robustly characterize and predict tactical atmospheric and oceanographic conditions. This integrated METOC picture will support real-time

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

battlespace awareness of propagation conditions affecting signals across the electromagnetic spectrum. METOC data will be fused with other intelligence data and automatically provided to shipboard combat systems to inform kinetic and non-kinetic fires.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Naval Integrated Tactical Environmental System Next Generation (NITES-Next) | 0.000 | 9.268 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

***FY 2019 Plans:***
Naval Integrated Tactical Environmental System Next Generation (NITES-Next) will complete software development activities on the Fleet Capability Release (FCR)-2 (v2.0.2.0) and continue FCR-3 Task Orders in support of deployments. NITES-Next will complete initial software development of FCR 3 mobile variant which integrates new mobile requirements with the previous afloat version of FCR 2.x. The new mobile variant will modernize the current NITES-Fielded suite of systems. In addition to replacing end of life hardware, NITES-Next will continue to develop software to replace aging software that has been determined to have cyber vulnerabilities. The program will also upgrade all Force-level ships (20+) and mobile variant platforms (450+) available. The NITES-Next program will continue to conduct Systems Integration Test (SIT) and System Qualification Testing (SQT) activities in support of the planned Consolidated Afloat Network and Enterprise Services (CANES) Application Integration (AI)/SIT and Developmental Test and Evaluation (DT&E) events. The program will mature its Risk Management Framework (RMF) Bridge Conversion (RBC) Authority to Operate (ATO) for Fleet Capability Release (FCR)-2.x and FCR-3 software. Additionally, FCR-3 will include the development of an Electromagnetic (EM) Prediction capability to be delivered in FY20. The program will prepare for Field Technical Review (FTR), FCR-3 Fielding Decision (FD) and FCR-4 Build Decision (BD) in FY20. The program will continue planning for the FCR-4 development and contracting activities (including updating all required documentation, Requirements Development Package (RDP), Cost Analysis Requirements Document (CARD), Program Life Cycle Cost Estimate (PLCCE), Technology Readiness Assessment (TRA) Letter, Build Technical Review (BTR) and Authority to Operate (ATO). The program will begin planning for FCR-5 development and contracting activities.

***FY 2020 Base Plans:***
FY20 funding has been realigned to PE 0604231N Project 2343 as part of PE Consolidation.

***FY 2020 OCO Plans:***
N/A

***FY 2019 to FY 2020 Increase/Decrease Statement:***

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604231N Project 2343. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 9.268 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4226: *Meteorological Equipment* | 21.000 | 21.072 | 14.687 | - | 14.687 | 14.876 | 13.366 | 13.814 | 13.357 | Continuing | Continuing |
| • RDTEN/0603207N/2343: *Tactical METOC Applications* | 11.448 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 175.172 |
| • RDTEN/0604231N/2343: *Tactical METOC Applications* | 0.000 | 0.000 | 12.198 | - | 12.198 | 12.052 | 12.644 | 13.913 | 14.196 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The NITES-Next program acquisition, management and contracting strategies are to support the Tactical Meteorology & Oceanography (METOC) Applications project to continue the development of state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessment capabilities for open ocean and littoral operating environments. The Department of the Navy (DoN) maintains management oversight of the NITES-Next program's acquisition and contracting strategies. The Department of the Navy (DoN) requirements for the NITES-Next program's acquisition and contracting strategies are based on approved Joint Capabilities Integration and Development System (JCIDS) documentation.

**E. Performance Metrics**

Goal: Field software decision aid capabilities for Navy and Marine Corps war fighters in order to facilitate the characterization and prediction of the physical environment in the battlespace.

Metric: Meet the performance metrics identified in approved Naval Integrated Tactical Environmental Next Generation (NITES-Next) Program's requirements documents (e.g., Concept Definition Document (CDD) and individual Requirements Definition Packages (RDPs)).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NITES-Next | WR | SSC Pacific : San Diego, CA | 0.000 | 0.000 | | 2.259 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.259 | - |
| NITES-Next | C/FP | SAIC : Virginia | 0.000 | 0.000 | | 1.798 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.798 | - |
| NITES-Next | WR | SSC Atlantic : South Carolina | 0.000 | 0.000 | | 0.080 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.080 | - |
| NITES-Next / Engineering | C/IDIQ | Various : Various | 0.000 | 0.000 | | 3.396 | May 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.396 | - |
| Product Development Prior Year | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 7.533 | | 0.000 | | - | | 0.000 | 0.000 | 7.533 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Prior Year | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| NITES-Next | C/FP | SAIC : Virginia | 0.000 | 0.000 | | 1.054 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.054 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 1.054 | | 0.000 | | - | | 0.000 | 0.000 | 1.054 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Services Prior Year | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| NITES-Next | WR | SSC Pacific : San Diego, CA | 0.000 | 0.000 | | 0.259 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.259 | - |
| NITES-Next | C/FP | BAH : San Diego, CA | 0.000 | 0.000 | | 0.422 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.422 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.681 | | 0.000 | | - | | 0.000 | 0.000 | 0.681 | N/A |

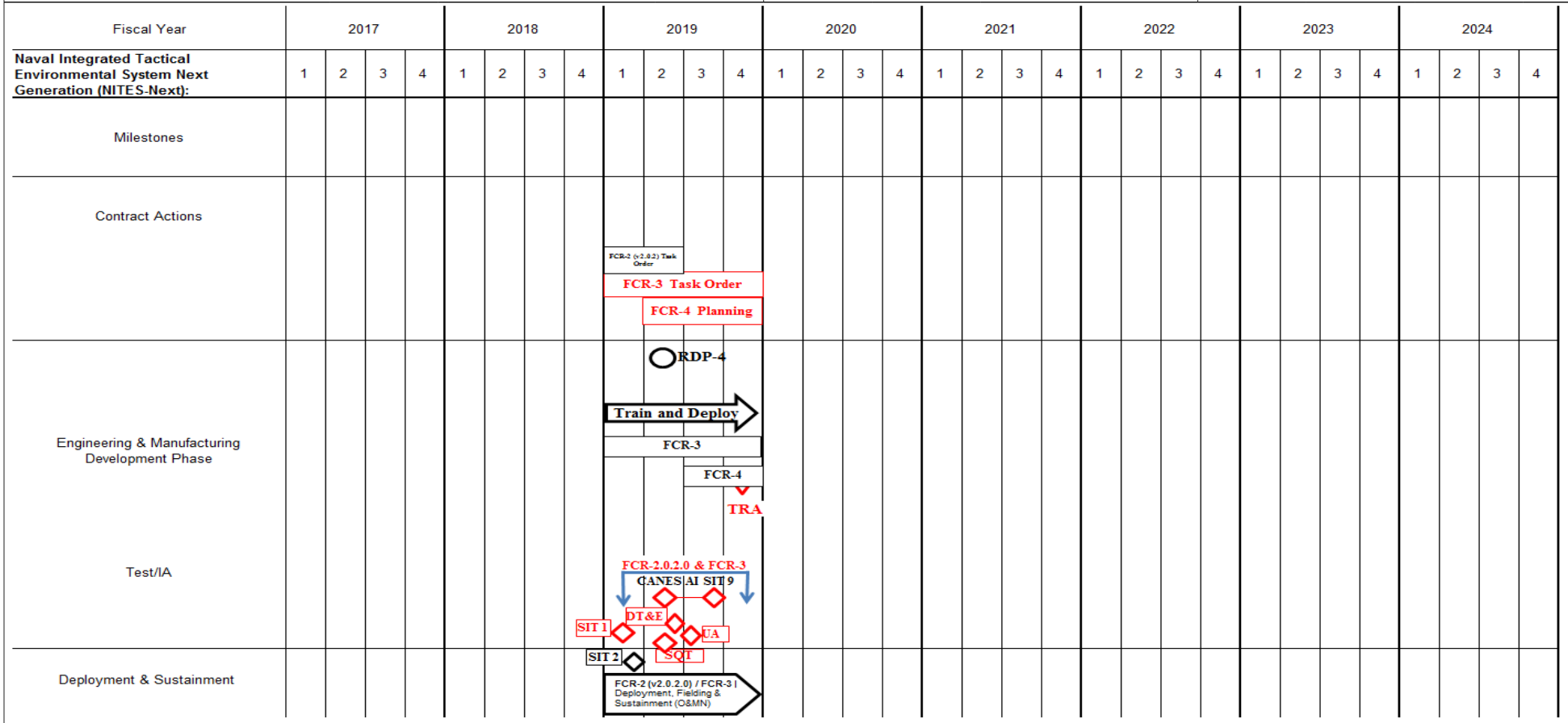
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 9.268 | | 0.000 | | - | | 0.000 | 0.000 | 9.268 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604231N Project 2343. Prior year costs are reflected in PE 0603207N Project 2343, where they were executed before the FY19 Budget Activity reclassification.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |




**NOTE:** Efforts in FY20 and out are funded under PE 0604231N Proj 2343

**Acronyms:** OTRR = Opertional Test Readiness Review. RDP = Requirements Definition Package. FCR = Fleet Capability Release. TRA = Technology Readiness Assessment. BD = Build Decision. FD = Fielding Decision. Limited Fielding Decision = LFD. IOC= Initial Operational Capability. IATO = Interim Authority to Operate. ATO = Authority to Operate. UA = User Assessment. BTR = Build Technical Review. Field Technical Reivew = FTR. SIT = System Integration Test. RALOT = Risk Assessment Level of Testing. DT&E = Developmental Test & Evaluation. ADM - Acquisition Decision Memorandum. SOVT = System Verification Operational Test. CANES = Consolidated Afloat Networks and Enterprise Services. AI = Application Integration.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Naval Integrated Tactical Environmental System Next Generation (NITES-Next)*** | | | | |
| Contract Actions: FCR-2 Task Order (v2.0.2) | 1 | 2019 | 2 | 2019 |
| Contract Actions: FCR-3 Task Order | 1 | 2019 | 4 | 2019 |
| Contract Actions: FCR-4 Planning | 2 | 2019 | 4 | 2019 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 2 / Train Deploy | 1 | 2019 | 4 | 2019 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 3 | 1 | 2019 | 4 | 2019 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 4 | 3 | 2019 | 4 | 2019 |
| Engineering & Manufacturing Development Phase: Requirements Definition Package - 4 | 2 | 2019 | 2 | 2019 |
| Engineering & Manufacturing Development Phase: Technology Readiness Assessment - 4 | 4 | 2019 | 4 | 2019 |
| Test/IA: Fleet Capability Release V 2.0.2.0 | 1 | 2019 | 4 | 2019 |
| Test/IA: Fleet Capability Release - 3 | 1 | 2019 | 4 | 2019 |
| Test/IA: System Integration Test - 1 (FCR-3) | 1 | 2019 | 1 | 2019 |
| Test/IA: System Integration Test - 2 (FCR-3) | 1 | 2019 | 1 | 2019 |
| Test/IA: System Qualification Test FCR-3 | 2 | 2019 | 2 | 2019 |
| Test/IA: Developmental Test Fleet Capability Release - FCR V2.0.2.0 | 2 | 2019 | 2 | 2019 |
| Test/IA: User Assessment FCR-3 | 3 | 2019 | 3 | 2019 |
| Test/IA: CANES AI SIT FCR-3 | 2 | 2019 | 3 | 2019 |
| Deployment and Sustainment: Deployment, fielding and Sustainment (OMN) | 1 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2345 / *Fleet METOC Equipment* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2345: *Fleet METOC Equipment* | 64.609 | 0.755 | 0.672 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 66.036 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned out of PE 0604218N Project 2345, into PE 0604231N Project 2345 as part of RDTEN PE Consolidation starting in FY20.

**A. Mission Description and Budget Item Justification**

This project provides for the engineering and manufacturing development of sensors, communication interfaces, processing and display meteorological and oceanographic (METOC) equipment. This equipment is designed to provide future mission capabilities for war fighters to measure, ingest, store, process, distribute and display METOC parameters and derived products.

This project also exploits new government off-the-shelf/commercial off-the-shelf technologies, tactical sensors and web enablement for the Navy's computer-based tactical shipboard and shore capability used to predict and assess the operational effects of the physical environment on the performance of platforms, weapons and sensor systems. This project includes development of warfare specific mission planning modules to support unmanned systems with integration of data from environmental and tactical sensor systems, model forecast information and Geospatial Information & Services Databases. This project also supports development of autonomous environmental sensing systems for situational awareness and tactical decision aid/mission planner support, as well as iridium and advanced satellite communication integration in METOC sensor, vehicle control and mission planning systems that will be required to achieve Chief of Naval Operation objectives for information dominance and decision superiority.

Major emphasis areas include the Meteorological and Oceanographic Future Mission Capabilities (METOC FMC) project, Littoral Battlespace Sensors - Unmanned Undersea Vehicles (LBS-UUV) and the Environmental Satellite Receiver Processor (ESRP) program (comprised of AN/SMQ-11 (sea and shore configuration) and AN/FMQ-17 (shore configuration) systems).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Littoral Battlespace Sensors - Unmanned Undersea Vehicle (LBS-UUV) | 0.445 | 0.358 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to conduct LBS-G, LBS-AUV, and LBS-AUV(S) (Razorback) engineering design studies. Continue developing system upgrades via Engineering Change Proposals (ECP's) and correct any identified software and/or hardware deficiencies. Continue investigating next generation propulsion technologies such as Hybrid Thruster, battery chemistry, thermal engines, and universal buoyancy engines for potential system upgrades. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Also, investigating battery technology, bio-fouling solutions, afterbody solutions, and open architecture approaches.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604231N Project 2345 as part of PE Consolidation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 Justification and change explanation is provided under PE 0604231N Project 2345. | | | | | |
| ***Title:*** Environmental Satellite Receiver Processor (ESRP) | 0.310 | 0.314 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to develop and test annual hardware and software upgrades to integrate new meteorological and oceanographic (METOC) Satellite Sensors available in the Geostationary Operational Environmental Satellites (GOES) and the Polar Orbiting Environmental Satellites (POES). Continue integration of Environmental Satellite Receiver Processor (ESRP) systems in support of Weather Satellite Follow-On (WSF-M), Operational Response Space (ORS)-8, GOES-16, GOES-17 and Europe Meteorology Satellites (EUMETSAT) satellites. Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604231N Project 2345 as part of PE Consolidation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604231N Project 2345. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.755 | 0.672 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4226: *Meteorological Equipment* | 21.000 | 21.072 | 14.687 | - | 14.687 | 14.876 | 13.366 | 13.814 | 13.357 | Continuing | Continuing |
| • RDTEN/0603207N/2341: *METOC Data Acquisition* | 5.276 | 3.471 | 4.662 | 2.400 | 7.062 | 6.089 | 6.181 | 7.858 | 8.016 | Continuing | Continuing |
| • RDTEN/0603207N/2342: *METOC Data Assimilation and MOD* | 20.959 | 17.441 | 21.168 | - | 21.168 | 22.355 | 22.382 | 22.004 | 22.438 | Continuing | Continuing |
| • RDTEN/0604231N/2345: *Fleet METOC Equipment* | 0.000 | 0.000 | 0.220 | - | 0.220 | 0.620 | 0.577 | 0.487 | 0.496 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Acquisition, management and contracting strategies are to support engineering and manufacturing development by providing funds to Hydroid, Teledyne Brown and Naval Research Laboratory.

**E. Performance Metrics**

Goal: Develop and engineer equipment to acquire Meteorological and Oceanographic (METOC) data in order to improve the accuracy of global and regional scale METOC forecast models.

Metric: Tasks will address no less than 75% of applicable capability gaps and requirements, as identified by Resource and Requirements Sponsor(s). As tasks relate to exploitation of fleet sensors for METOC data (Through-the-Sensor), no less than 80% of approved initiatives will maintain cost, schedule, performance and transition risk analysis certification that will have been completed within the past 12 months.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prioir Year METOC Requirements | Various | Various : Various | 56.530 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 56.530 | - |
| Littoral Battlespace Sensing - Gliders | C/CPIF | Teledyne Brown Engineering : Alabama | 1.606 | 0.000 | | 0.132 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.738 | Continuing |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle | C/FP | Hydroid : Pocasset, MA | 1.703 | 0.266 | Jan 2018 | 0.226 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.195 | Continuing |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle (Submarine)/Razorback | C/CPFF | NRL : Monterey, CA | 0.000 | 0.179 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.179 | - |
| METOC ESRP | SS/CPFF | RAYTHEON : Indianapolis | 1.627 | 0.310 | Feb 2018 | 0.314 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.251 | Continuing |
| | | **Subtotal** | 61.466 | 0.755 | | 0.672 | | 0.000 | | - | | 0.000 | 0.000 | 62.893 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC Future Mission Capabilities | C/CPFF | SSA/CSC : MISC | 1.312 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.312 | - |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle | Various | Various : Various | 0.767 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.767 | - |
| | | **Subtotal** | 2.079 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.079 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2345 / *Fleet METOC Equipment* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | WR | OPTEVFOR : Virginia | 0.424 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.424 | - |
| Littoral Battlespace Sensing - Unmanned Undersea Vehicle | WR | NSWC Carderock : Maryland | 0.150 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| METMF R NEXGEN | C/FP | Smiths Detection : Rhode Island | 0.090 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.090 | - |
| | | **Subtotal** | 0.664 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.664 | N/A |

**Management Services ($ in Millions)**

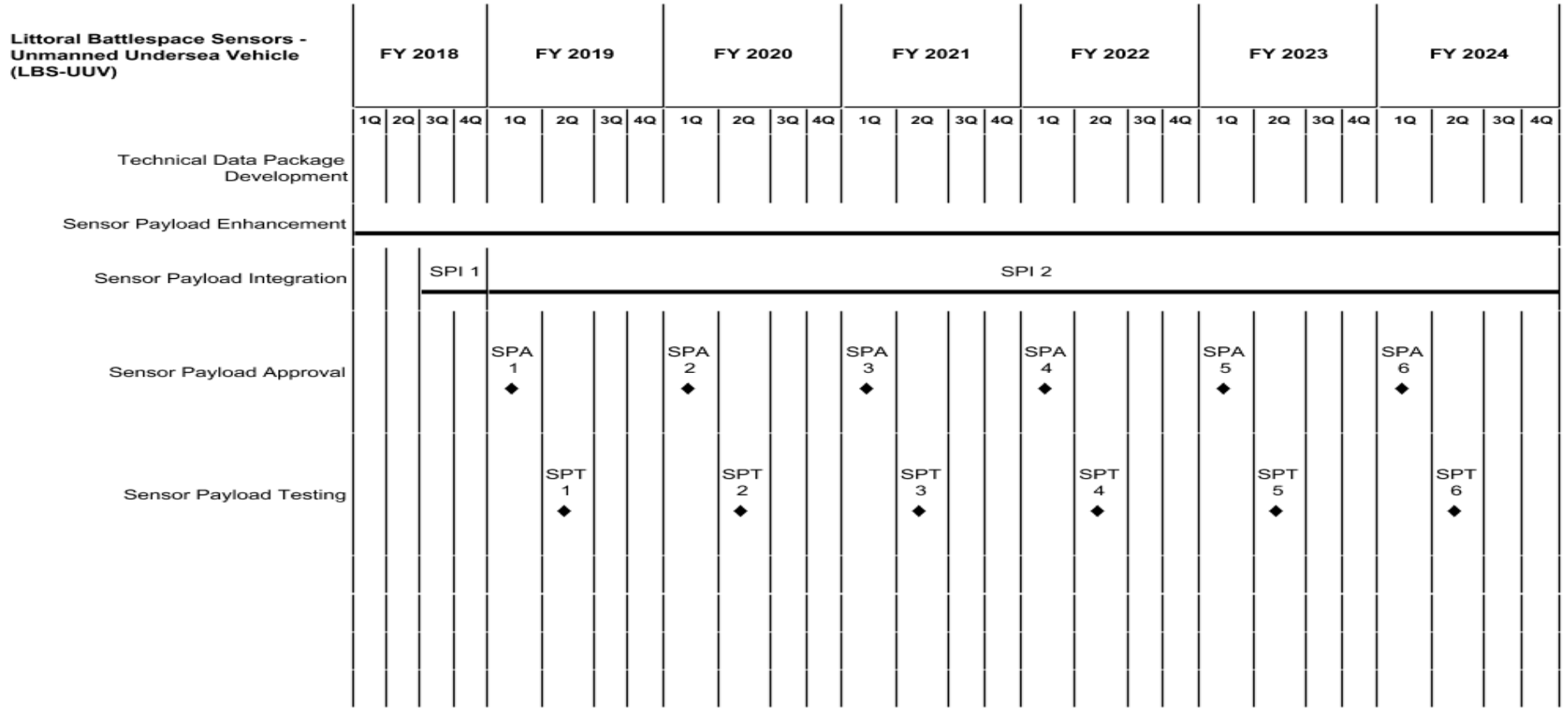
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Services | C/CPFF | SAIC : Virginia | 0.400 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| | | **Subtotal** | 0.400 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.400 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 64.609 | 0.755 | | 0.672 | | 0.000 | | - | | 0.000 | 0.000 | 66.036 | N/A |

**Remarks**

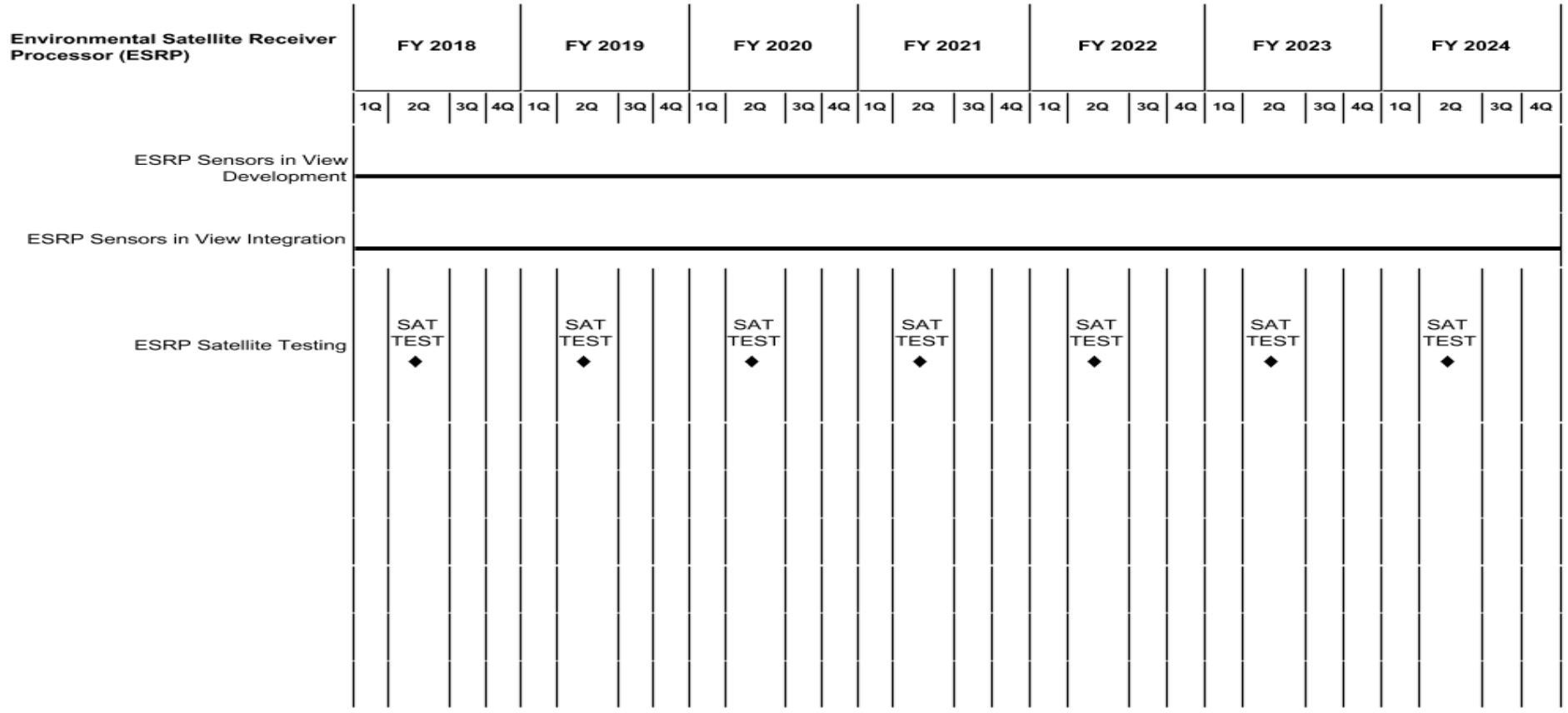
FY20 cost data is provided under PE 0604231N Project 2345.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |




*2020PB - 0604218N - 2345*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |




2020PB - 0604218N - 2345

Efforts in FY20 and out are funded under PE 0604231N Proj 2345.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Littoral Battlespace Sensors - Unmanned Undersea Vehicle (LBS-UUV)*** | | | | |
| Sensor Payload Enhancement: | 1 | 2018 | 4 | 2024 |
| Sensor Payload Integration: Sensor Payload Integration1 | 3 | 2018 | 4 | 2018 |
| Sensor Payload Integration: Sensor Payload Integration 2 | 1 | 2019 | 4 | 2024 |
| Sensor Payload Approval: Sensor Payload Approval 1 | 1 | 2019 | 1 | 2019 |
| Sensor Payload Approval: Sensor Payload Approval 2 | 1 | 2020 | 1 | 2020 |
| Sensor Payload Approval: Sensor Payload Approval 3 | 1 | 2021 | 1 | 2021 |
| Sensor Payload Approval: Sensor Payload Approval 4 | 1 | 2022 | 1 | 2022 |
| Sensor Payload Approval: Sensor Payload Approval 5 | 1 | 2023 | 1 | 2023 |
| Sensor Payload Approval: Sensor Payload Approval 6 | 1 | 2024 | 1 | 2024 |
| Sensor Payload Testing: Sensor Payload Testing 1 | 2 | 2019 | 2 | 2019 |
| Sensor Payload Testing: Sensor Payload Testing 2 | 2 | 2020 | 2 | 2020 |
| Sensor Payload Testing: Sensor Payload Testing 3 | 2 | 2021 | 2 | 2021 |
| Sensor Payload Testing: Sensor Payload Testing 4 | 2 | 2022 | 2 | 2022 |
| Sensor Payload Testing: Sensor Payload Testing 5 | 2 | 2023 | 2 | 2023 |
| Sensor Payload Testing: Sensor Payload Testing 6 | 2 | 2024 | 2 | 2024 |
| ***Environmental Satellite Receiver Processor (ESRP)*** | | | | |
| ESRP Sensors in View Development: ESRP Sensors in View Development | 1 | 2018 | 4 | 2024 |
| ESRP Sensors in View Integration: ESRP Sensors in View Integration | 1 | 2018 | 4 | 2024 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY18) | 2 | 2018 | 2 | 2018 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY19) | 2 | 2019 | 2 | 2019 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY20) | 2 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ESRP Satellite Testing: ESRP Satellite Testing (FY21) | 2 | 2021 | 2 | 2021 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY22) | 2 | 2022 | 2 | 2022 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY23) | 2 | 2023 | 2 | 2023 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY24) | 2 | 2024 | 2 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2363: *Remote Sensing Capability Development* | 0.000 | 0.000 | 5.642 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.642 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

FY19 funding control for Remote Sensing Capability Development RSCD (x2363) was moved from Program Element (PE) 0603207N AIR/OCEAN TACTICAL APPLICATIONS to PE 0604218N AIR/OCEAN EQUIPMENT ENGINEERING as a result of a Budget Activity (BA) reclassification.

FY20 funding control and beyond has been realigned out of PE 0604218N Project 2363, into PE 0604231N Project 2363 as part of RDTEN PE Consolidation.

**A. Mission Description and Budget Item Justification**

RSCD characterizes the ocean environment using a variety of remote sensing techniques that provide that capability to discriminate atypical oceanographic phenomena from the natural environment that will greatly improve undersea dominance capabilities. The Naval Oceanographic Office will employ oceanographic data to refine and extend environmental characterization of the phenomena and disseminate data to the Fleet. Efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Remote Sensing Capability Development | 0.000 | 5.642 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue data collection in various weather and sea states to broaden the range of environmental conditions and reduce uncertainty in environmental prediction. Continue software algorithm performance analysis. Continue software algorithm enhancements to automatically detect oceanographic phenomena. Continue software algorithm enhancements and modifications to support transition to a new architecture. Continue to implement the algorithm performance assessment strategy as well as the test and evaluation plans. Document software algorithm test reports. Continue to integrate algorithms for access over the network. Continue development of training to provide the user community education on using the different tools and applications. Coordinate Task, Collect, Process, Exploit, Disseminate (TCPED) process amongst inter-agencies to support Navy Missions. Based on emerging threats, expand scope of the Seahorse project to include new surface detection algorithms. Continue to develop, enhance, and integrate, surface detection algorithm capabilities, and provide input to Fleet | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| training and Concept of Operations (CONOPS) development. Effort introduces rigor and standardization of target detection capabilities in support of CLUTCHSHOT.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604231N Project 2363 as part of PE Consolidation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604231N Project 2363. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 5.642 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0603207N/2363: *Remote Sensing Capability Development* | 3.816 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 13.116 |
| • RDTEN/0604231N/2363: *Remote Sensing Capability Development* | 0.000 | 0.000 | 5.651 | - | 5.651 | 7.448 | 4.862 | 4.740 | 4.838 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Remote Sensing Capability Development (RSCD) is being managed as a Program Executive Office (PEO) Project, via a Project Definition Document (PDD) construct for acquisition rigor and oversight.

**E. Performance Metrics**

Available in the Project's Requirements Definition Package (RDP).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | C/FFP | SAIC : Virginia | 0.000 | 0.000 | | 0.816 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.816 | - |
| Remote Sensing Capability Development Data Collection | WR | NRL : Washington, DC | 0.000 | 0.000 | | 1.269 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.269 | - |
| Remote Sensing Capability Development Data Collection | C/FFP | Cubic : San Diego, CA | 0.000 | 0.000 | | 1.410 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.410 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 3.495 | | 0.000 | | - | | 0.000 | 0.000 | 3.495 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.888 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.888 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.888 | | 0.000 | | - | | 0.000 | 0.000 | 0.888 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 1.259 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.259 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 1.259 | | 0.000 | | - | | 0.000 | 0.000 | 1.259 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

**Management Services ($ in Millions)**

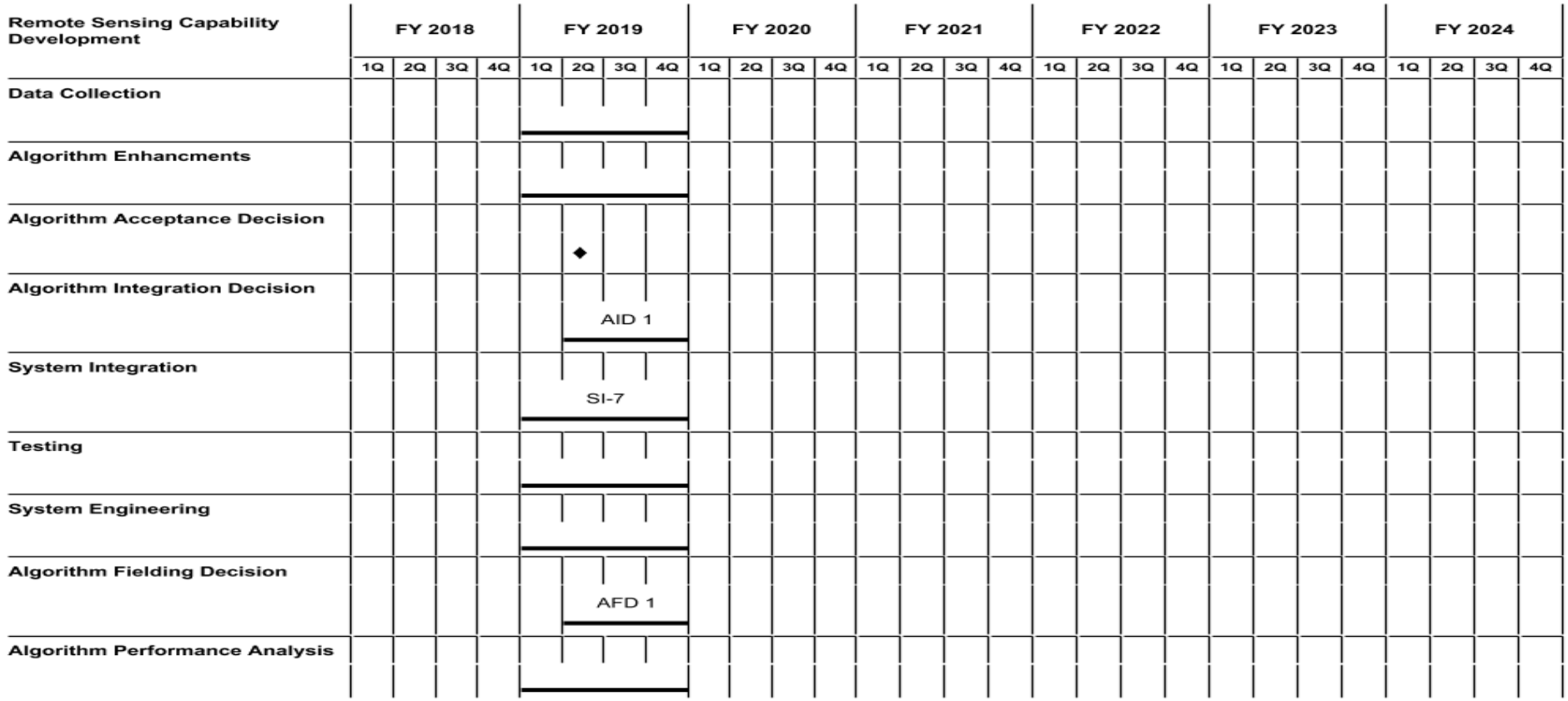
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | C/FP | BAH : Virginia | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 5.642 | | 0.000 | | - | | 0.000 | 0.000 | 5.642 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604231N Project 2363. Prior year costs are reflected in PE 0603207N Project 2363.L39, where they were executed before the FY19 Budget Activity reclassification.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |




*2020PB - 0604218N - 2363*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Remote Sensing Capability Development*** | | | | |
| Data Collection: | 1 | 2019 | 4 | 2019 |
| Algorithm Enhancments: | 1 | 2019 | 4 | 2019 |
| Algorithm Acceptance Decision: | 2 | 2019 | 2 | 2019 |
| Algorithm Integration Decision: Algorithm Integration Decision 1 | 2 | 2019 | 4 | 2019 |
| System Integration: System Integration 7 | 1 | 2019 | 4 | 2019 |
| Testing: | 1 | 2019 | 4 | 2019 |
| System Engineering: | 1 | 2019 | 4 | 2019 |
| Algorithm Fielding Decision: Algorithm Fielding Decision 1 | 2 | 2019 | 4 | 2019 |
| Algorithm Performance Analysis: | 1 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604218N / *Air/Ocean Equipment Engineering* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 4.828 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.828 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This Congressional Add provides funds to develop a system to support research and evaluation of Unmanned Maritime Systems and Sensors. The goal for this program is to develop and test long-term monitoring Gulf of Mexico water space using a variety of utilize unmanned maritime systems and to conduct an evaluation of readiness capabilities for new ocean prediction systems.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Unmanned Systems in Maritime Environment | 4.828 | 0.000 |
| ***FY 2018 Accomplishments:*** Evaluate unmanned maritime sensors and systems with respect to operation of high-resolution ocean prediction systems focused on the Gulf of Mexico water space. | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 4.828 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

The performance goal is met if successful development test and evaluation is achieved.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

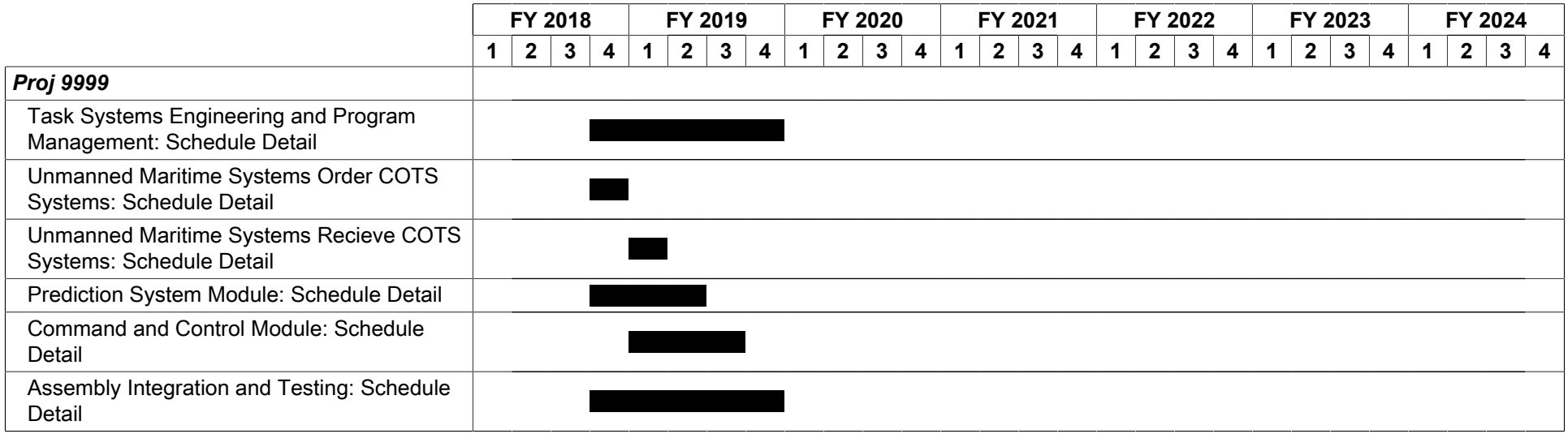
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unmanned Maritime Systems | TBD | TBD : TBD | 0.000 | 2.000 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.000 | - |
| Ocean Prediction Systems | TBD | TBD : TBD | 0.000 | 2.828 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.828 | - |
| | | **Subtotal** | 0.000 | 4.828 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.828 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 4.828 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.828 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604218N / *Air/Ocean Equipment Engineering* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Task Systems Engineering and Program Management: Schedule Detail | 4 | 2018 | 4 | 2019 |
| Unmanned Maritime Systems Order COTS Systems: Schedule Detail | 4 | 2018 | 4 | 2018 |
| Unmanned Maritime Systems Recieve COTS Systems: Schedule Detail | 1 | 2019 | 1 | 2019 |
| Prediction System Module: Schedule Detail | 4 | 2018 | 2 | 2019 |
| Command and Control Module: Schedule Detail | 1 | 2019 | 3 | 2019 |
| Assembly Integration and Testing: Schedule Detail | 4 | 2018 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604221N *I P-3 Modernization Program* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 22.519 | 1.331 | 2.134 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.984 |
| 3016: *Fatigue Life Mgmt Program* | 22.519 | 1.331 | 2.134 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.984 |

**A. Mission Description and Budget Item Justification**

Fatigue Life Management Program is required to manage P-3/EP-3 inventory fatigue life and includes ongoing structural analysis, analyzing emergent structural issues, conducting engineering studies, assessing Fleet impact, and applying new technologies such as Non-Destructive Inspection techniques.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 1.361 | 2.134 | 0.001 | - | 0.001 |
| Current President's Budget | 1.331 | 2.134 | 0.000 | - | 0.000 |
| Total Adjustments | -0.030 | 0.000 | -0.001 | - | -0.001 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.030 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.001 | - | -0.001 |

**Change Summary Explanation**

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604221N / *P-3 Modernization Program* | Project (Number/Name)<br>3016 / *Fatigue Life Mgmt Program* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3016: *Fatigue Life Mgmt Program* | 22.519 | 1.331 | 2.134 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.984 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Fatigue Life Management Program is required to manage P-3/EP-3 inventory fatigue life and includes ongoing structural analysis, analyzing emergent structural issues, conducting engineering studies, assessing Fleet impact, and applying new technologies such as Non-Destructive Inspection techniques.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** P-3/EP-3 Fatigue Life Management | 1.331 | 2.134 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Fatigue Life Management Program: Manage P-3/EP-3 inventory fatigue life including conducting structural analysis, analyzing structural issues, conducting engineering studies, and assessing Fleet impact. Research, test and apply new Fatigue Inspection techniques to the P-3/EP-3 Fleet. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY19 - FY20 funding request was reduced by $2.134 million to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.331 | 2.134 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0538: *P-3 Series* | 0.700 | 0.803 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4,910.963 |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604221N / *P-3 Modernization Program* | **Project (Number/Name)**<br>3016 / *Fatigue Life Mgmt Program* |

**D. Acquisition Strategy**

The Fatigue Life Management Program leverages off of prior work done under P-3 Service Life Extension Program (2451). The Anti-Surface Warfare Improvement Program Operational Requirements Documents 355-88-94 was approved 30 March 94. Work will be performed by Lockheed Martin Aeronautical Systems and other industry participants along with the Naval Air Systems Command Structural Engineering Dept, AIR-4.3. This program supports the 7 June 2003 CNO approved P-3/EP-3 Sustainment Bridge to Multi-Mission Maritime Aircraft.

**E. Performance Metrics**

Successful application of system engineering processes.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604221N / *P-3 Modernization Program* | Project (Number/Name)<br>3016 / *Fatigue Life Mgmt Program* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | C/CPIF | LM : Marietta, GA | 11.924 | 0.748 | Jan 2018 | 1.528 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 14.200 | 14.245 |
| | | **Subtotal** | 11.924 | 0.748 | | 1.528 | | 0.000 | | - | | 0.000 | 0.000 | 14.200 | N/A |

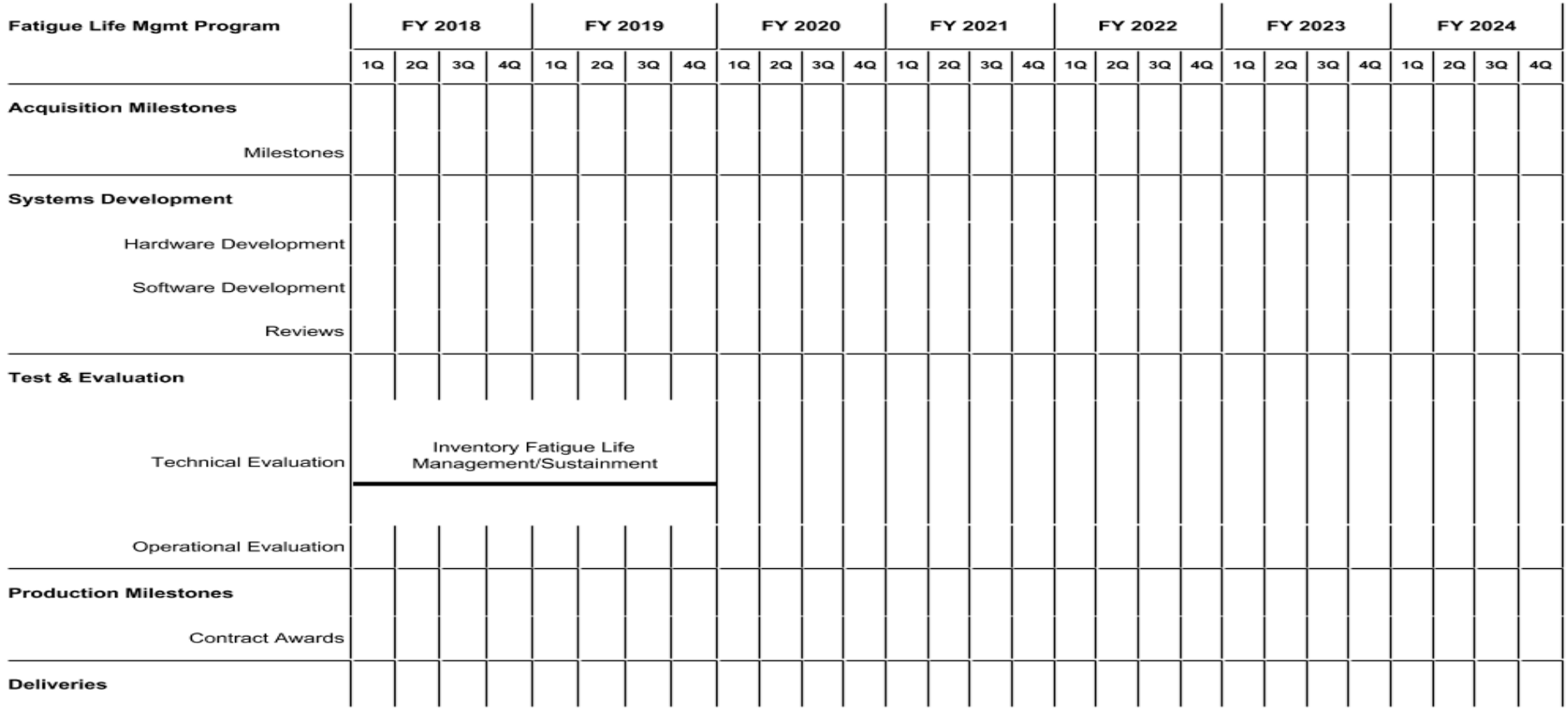
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWCAD : PAX RIVER, MD | 9.320 | 0.543 | Nov 2017 | 0.566 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 10.429 | 10.449 |
| Travel | WR | NAWCAD : PAX RIVER, MD | 1.005 | 0.040 | Oct 2017 | 0.040 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.085 | 1.085 |
| Prior Year costs no longer funded in FYDP | Various | Various : Various | 0.270 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.270 | - |
| | | **Subtotal** | 10.595 | 0.583 | | 0.606 | | 0.000 | | - | | 0.000 | 0.000 | 11.784 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 22.519 | 1.331 | | 2.134 | | 0.000 | | - | | 0.000 | 0.000 | 25.984 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604221N / *P-3 Modernization Program* | **Project (Number/Name)**<br>3016 / *Fatigue Life Mgmt Program* |




*2020DON - 0604221N - 3016*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604221N / *P-3 Modernization Program* | **Project (Number/Name)**<br>3016 / *Fatigue Life Mgmt Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Fatigue Life Mgmt Program*** | | | | |
| Test & Evaluation: Technical Evaluation: Inventory Fatigue Life Management/ Sustainment | 1 | 2018 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604230N *I Warfare Support System* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 82.111 | 19.004 | 9.729 | 8.601 | - | 8.601 | 8.148 | 7.640 | 7.380 | 7.528 | Continuing | Continuing |
| 3326: *NSW Rapid Capabilities Development for CIEC* | 26.073 | 13.156 | 6.004 | 6.747 | - | 6.747 | 6.152 | 5.890 | 5.655 | 5.768 | Continuing | Continuing |
| 4011: *Naval Coastal Warfare Surv and C4I Sys* | 48.275 | 3.748 | 3.043 | 0.771 | - | 0.771 | 0.792 | 0.808 | 0.821 | 0.838 | Continuing | Continuing |
| 9C86: *Combatant Craft Replacement* | 7.763 | 2.100 | 0.682 | 1.083 | - | 1.083 | 1.204 | 0.942 | 0.904 | 0.922 | Continuing | Continuing |

**Note**

Funding for the following project has been realigned out of PE 0604230N into PE 0604280N as part of Program Element Consolidation starting in FY20:
Project 4011 - C4I System

**A. Mission Description and Budget Item Justification**

The Rapid Capabilities Development (RCD) project supports the Naval Special Warfare Branch to identify and assess available technologies that confront current and future irregular and expeditionary challenges. The program's development efforts are focused on the enhancement/advancement of existing technologies to fill urgent and emergent capability gaps for Naval Special Warfare (NSW). Program funding provides for the development, integration, testing, validation and combat demonstration of identified technologies and/or packages of technologies to meet: Overseas Contingency Operations (OCO) goals, service common and NSW program technology challenges, and technology obsolescence issues of developed capabilities. The goal of the RCD project is to develop expeditionary/operational capabilities for NSW that enable its force to conduct cross-domain special reconnaissance, counterterrorism, direct action, irregular warfare, and foreign internal defense; and fulfill urgent/emergent needs within a 6-24 month timeframe.

As part of the Naval Coastal Warfare Surveillance program, Identity Dominance System (IDS) supports the Joint Personnel Identity (JPI) program. Maritime Expeditionary Security Force (MESF) have a mobile security mission that requires methodologies, procedures, equipment and the communications capacity to identify individuals who represent a potential threat as a means to deter and eliminate individuals from conducting asymmetric/non-traditional attacks upon friendly forces, high value assets and coastal areas that Naval Coastal Warfare (NCW) is charged with protecting. The Visit, Board, Search and Seizure (VBSS) teams conducting Expanded Maritime Interception Operations also have a similar requirement to identify individuals. The development of a device to support identity functions is captured in the IDS Capability Development Document (CDD) and implemented in the IDS Capability Production Document (CPD). IDS units are used in the following environments: aboard ships, ashore at ports, the littorals, and extended inland field environments worldwide. IDS is employed in both maritime and very austere ashore environments, carried by individuals who are part of ship boarding parties and by dismounted patrols. These mission and environmental requirements demand the need for a portable, lightweight, ruggedized, and reliable system with intuitive and user friendly features. IDS biometric modalities may differ by mission profile, requiring the authoritative response to the On-Scene Commander/Boarding Officer on whether to detain or further investigate an individual of interest or engage in a more thorough search of boarded ships.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604230N *I Warfare Support System* |

The Navy Expeditionary C4I project supports the Navy Expeditionary Combat Command (NECC) mission to detect, deter or interdict potential threats to DoN assets using agile, modular and scalable technology. NECC units have a number of current and future Command, Control, Communications, Computers & Intelligence (C4I) technological requirements for Tactical/Command Operations Center, tactical vehicles, combatant craft, and dismounted personnel. NECC operations require units to maintain effective command and control, develop and display a common tactical picture, and share intelligence and current operational information with higher headquarters, subordinate units, joint forces and coalition allies. Small, Medium, and Large Scale Communication Systems (LSCS) are the C4I hub for the NECC; Navy Enterprise Tactical Command and Control (NETC2) is the converged LSCS baseline. Future C4I research and development include enhanced information transport, network cyber security posture, assured communications in denied environments along with agility and mobility. Funding is required for testing and evaluation of cyber security issue associated with obsolescence of network items and if not addressed will impact the ability of the Program Office to maintain system accreditation under Risk Management Framework (RMF) revoking multiple LSCS assets authority to connectivity on the Department of Defense Information Network (DoDIN). Efforts are in alignment with NECC's strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities and maintain alignment with greater DoD initiatives, such as Joint Information Environment (JIE), Mission Partner Environment (MPE) in order to maintain interoperability and drive down DoN enterprise costs.

Combatant Craft Replacement will provide second generation Riverine Multi Mission Craft that will replace in-service Riverine Patrol Boats (RPBs) and Riverine Assault Boats (RABs). Combatant Craft replacements will: conduct inland waterway patrol and interdiction to preserve the rivers for friendly use as lines of communications; deny the use of rivers and waterways to waterborne and immediate shore sited hostile forces by barrier and interdiction operations; and, with augmentation of ground and air forces, locate and destroy hostile forces within a riparian area. Specific mission and capabilities will be identified in an Initial Capabilities Document (ICD). RDT&E funding will fund feasibility studies and procurement of mock-ups and prototype craft to demonstrate capabilities prior to production craft procurement.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 14.167 | 9.729 | 10.689 | - | 10.689 |
| Current President's Budget | 19.004 | 9.729 | 8.601 | - | 8.601 |
| Total Adjustments | 4.837 | 0.000 | -2.088 | - | -2.088 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.563 | 0.000 | | | |
| • Program Adjustments | 5.400 | 0.000 | -2.057 | - | -2.057 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.031 | - | -0.031 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604230N *I Warfare Support System* |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $1.012 million to account for the availability of prior year execution balances. Reduction of $1.045M due to PE consolidation.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604230N / *Warfare Support System* | Project (Number/Name)<br>3326 / *NSW Rapid Capabilities Development for CIEC* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3326: *NSW Rapid Capabilities Development for CIEC* | 26.073 | 13.156 | 6.004 | 6.747 | - | 6.747 | 6.152 | 5.890 | 5.655 | 5.768 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Rapid Capabilities Development (RCD) project supports the Naval Special Warfare Branch to identify and assess available technologies that confront current and future irregular and expeditionary challenges. The program's development efforts are focused on the enhancement/advancement of existing technologies to fill urgent and emergent capability gaps for Naval Special Warfare (NSW). Program funding provides for the development, integration, testing, validation and combat demonstration of identified technologies and/or packages of technologies to meet: Contingency Operations goals, service common and NSW program technology challenges, and technology obsolescence issues of developed capabilities.

The goal of the RCD project is to develop expeditionary/operational capabilities for NSW that enable its force to conduct cross-domain special reconnaissance, counterterrorism, direct action, irregular warfare, and foreign internal defense; and fulfill urgent/emergent needs within a 6-24 month timeframe.

In addition to supporting NSW the program also provides support for irregular warfare and expeditionary related urgent/emergent technology requirements as outlined in Joint Urgent Operational Needs (JUON), Navy Urgent Operational Needs (UON), and/or support rapid insertion into a Department of Navy (DoN) Program of Record (PoR) or other acquisition programs.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Navy Irregular Warfare | 13.156 | 6.004 | 6.747 | 0.000 | 6.747 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The RCD program, PB19 budgeted value of $6.004M, will utilize;<br><br>$1.3M for CUAS Joint Urgent Operational Need (JUON) to identify, assess, integrate and test prototype technologies supporting NSW deployed forces encountering the proliferation of unconventional, unmanned system threats by non-state actors. Efforts will focus on continuing advancement of FY18 prototyping efforts and field evaluation of developed technologies.<br><br>$1.5M for MPE integration and field testing of the developed land and maritime variants to further refine the operational gaps associated to precision strike from a light, tactical vehicle; and small surface craft. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| $1.404M for sensor integration (Electro-Optic(EO)/Infrared(IR), Acoustic, Radio Frequency (RF)), payload development, signature management, navigation and communications in denied environments, and technologies that will support improvements to human performance on the battlefield.<br><br>$1.8M to support the Broad Area Announcement process for the identification of technologies that enhance and/or accelerate expeditionary and irregular capabilities in support of NSW capability challenges; which remains open. Proposals received via this process will be reviewed for potential award in FY 2019, selected and submitted to contracting for execution.<br><br>***FY 2020 Base Plans:***<br>The RCD program, PB20 budgeted value of $6.747M, will utilize;<br>$2.0M for communications and navigation in denied environments; and integration of these systems aboard Naval Special Warfare undersea and surface mobility assets.<br>$3.347M for sensor integration (EO/IR, Acoustic, RF), payload development, signature management, and technologies that will support improvements to human performance on the battlefield; and continuing advancement of FY19 prototyping efforts and field evaluation of developed technologies.<br>$1.4M to support various Broad Area Announcement processes for theidentification of technologies that enhance and/or accelerate expeditionary and irregular capabilities in support of NSW capability challenges.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY2020 funding increased by $0.743 million for continued prototyping efforts and field evaluation of developed technologies. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 13.156 | 6.004 | 6.747 | 0.000 | 6.747 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

**D. Acquisition Strategy**

Identify the requirements necessary to meet immediate and future warfighter needs; integrate existing unique and/or related capabilities that can best meet those warfighter needs; test those integrated capabilities; and then demonstrate in real time and/or during planned deployments within a 6-24 month period. Endeavor to leverage existing mature technologies to take advantage of investments already made to reduce cost and time to market; and seek out cost-sharing opportunities with other resource sponsors to make program funding more effective for the expeditionary end-user.

**E. Performance Metrics**

Test, verify and validate developed system parameters against approved threshold and objective operational requirements established by the intended expeditionary end-user within the established budget and schedule. Transition the developed technologies to the respective Program Managers or end-users for operational evaluation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Spt | C/CPFF | Dell : Washington, DC | 0.625 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Spt | C/CPAF | Cydecor : Arlington, VA | 0.216 | 0.100 | Feb 2018 | 0.150 | Feb 2019 | 0.150 | Feb 2020 | - | | 0.150 | 0.000 | 0.616 | - |
| Travel | WR | NAVSEA/HQ : Washington, DC | 0.299 | 0.060 | Dec 2017 | 0.050 | Dec 2018 | 0.050 | Dec 2019 | - | | 0.050 | Continuing | Continuing | Continuing |
| Program Management Spt | WR | NAVSEA/HQ : Washington, DC | 0.039 | 0.217 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.256 | - |
| Program Management Spt | WR | NSWC : Crane, IN | 0.000 | 0.300 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| Program Management Spt | WR | NSWC : Dahlgren, VA | 0.000 | 0.050 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Program Management Spt | WR | NSWC : Panama City, FL | 0.000 | 0.050 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Program Management Spt | WR | NSWC : Carderock, MD | 0.000 | 0.050 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Program Management Spt | WR | NUWC : Newport, RI | 0.000 | 0.050 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| | | **Subtotal** | 1.179 | 0.877 | | 0.200 | | 0.200 | | - | | 0.200 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NUWC : Newport, RI | 1.811 | 0.240 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NAWC : China Lake, CA | 0.595 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NSWC : Carderock, MD | 0.889 | 0.177 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | SS/CPFF | ARL/UT : Austin, TX | 0.447 | 0.250 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | SS/CPFF | SPAWAR : San Diego, CA | 1.195 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | SPAWAR : Charleston, SC | 1.050 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation -WR | WR | SPAWAR : San Diego, CA | 1.254 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | SS/FFP | ARL/PSU : State College, PA | 0.540 | 1.000 | May 2018 | 0.000 | | 0.300 | Oct 2019 | - | | 0.300 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NRL : Washington, DC | 0.300 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NSWC : Indian Head, MD | 1.862 | 0.000 | | 4.304 | Apr 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | Various | Various : Various | 2.274 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | SS/FFP | NSWC : Panama City, FL | 0.269 | 0.270 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.539 | - |
| Test and Evaluation-WR | WR | NSWC : Dahlgren, VA | 0.800 | 0.517 | May 2018 | 1.500 | Dec 2018 | 0.500 | Dec 2019 | - | | 0.500 | 0.000 | 3.317 | - |
| Test and Evaluation | SS/FFP | NSWC : Dahlgren, VA | 0.512 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.512 | - |
| Test and Evaluation | SS/CPFF | APL/JHU : Laurel, MD | 0.125 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.125 | - |
| Test and Evaluation | SS/CPFF | Army Research Lab. : Adelphia, MD | 0.247 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.247 | - |
| Test and Evaluation | SS/CPFF | PNNL : Richland, WA | 0.130 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.130 | - |
| Test and Evaluation | C/CPFF | Georgia Tech : Atlanta, GA | 1.634 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.634 | - |
| Test and Evaluation | C/CPFF | Charles River : Cambridge, MA | 0.521 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.521 | - |
| Test and Evaluation | C/CPFF | L3 Comm : Burlington, MA | 0.972 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.972 | - |
| Test and Evaluation | C/CPFF | QinetiQ NA : Waltham, MA | 0.704 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.704 | - |
| Test and Evaluation | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | SS/CPFF | Strategos Consulting : Coronado, Ca | 0.178 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.178 | - |
| Test and Evaluation | WR | NAVAIR : San Diego, CA | 0.425 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.425 | - |
| Test and Evaluation | SS/CPFF | NSMA : Wash, DC | 1.599 | 1.470 | Feb 2018 | 0.000 | | 0.500 | Jan 2020 | - | | 0.500 | 0.000 | 3.569 | - |
| Test and Evaluation | C/CPFF | Advanced Systems : Manassas, VA | 0.150 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| Test and Evaluation | SS/CPFF | NAVSEA : Washington, DC | 0.750 | 0.000 | | 0.000 | | 4.000 | Nov 2019 | - | | 4.000 | 0.000 | 4.750 | - |
| Test and Evaluation | WR | NSWC : Crane, IN | 0.471 | 0.665 | Feb 2018 | 0.000 | | 0.250 | Oct 2019 | - | | 0.250 | 0.000 | 1.386 | - |
| Test and Evaluation | Reqn | ANL : Chicago, IL | 0.114 | 0.000 | | 0.000 | | 0.100 | Oct 2019 | - | | 0.100 | 0.000 | 0.214 | - |
| Test and Evaluation | WR | NUWC : Keyport, RI | 0.289 | 0.059 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.348 | - |
| Test and Evaluation | SS/CPFF | General Atomics : San Diego, CA | 1.299 | 0.624 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.923 | - |
| Test and Evaluation | SS/CPFF | ASSETT : Manassas, VA | 0.385 | 0.545 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.930 | - |
| Test and Evaluation | SS/CPFF | Battelle : Columbus, OH | 0.734 | 1.135 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.869 | - |
| Test and Evaluation | SS/CPFF | WHOI : Woods Hole, MA | 0.000 | 0.225 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.225 | - |
| Test and Evaluation | SS/CPFF | Boeing : Seattle, WA | 0.000 | 0.300 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| Test and Evaluation | SS/CPFF | AeroVironment : Monrovia, CA | 0.000 | 0.525 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.525 | - |
| Test and Evaluation | SS/CPFF | Northrup Grumman : Falls Church, VA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Test and Evaluation | C/CPFF | IN POWER : Morrisville, NC | 0.292 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.292 | - |
| Test and Evaluation-WR | WR | NSWC : Panama City, FL | 0.077 | 0.320 | Feb 2018 | 0.000 | | 0.269 | Oct 2019 | - | | 0.269 | 0.000 | 0.666 | - |
| Test adn Evaluation | WR | NSWC : Corona, CA | 0.000 | 0.094 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.094 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

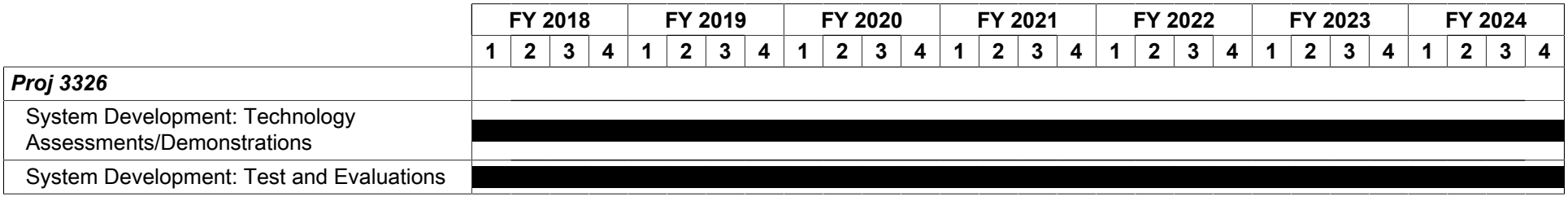
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | MIPR | Army : Ft Belvoir Va | 0.000 | 0.870 | Jan 2018 | 0.000 | | 0.628 | Jan 2020 | - | | 0.628 | 0.000 | 1.498 | - |
| Test and Evaluation | Reqn | NPS : Dayton OH | 0.000 | 0.500 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| Test and Evaluation | MIPR | DTIC : fT Belvoir Va | 0.000 | 0.220 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.220 | - |
| Test and Evaluation | MIPR | DLA : Ft Belvoir Va | 0.000 | 2.273 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.273 | - |
| | | **Subtotal** | 24.894 | 12.279 | | 5.804 | | 6.547 | | - | | 6.547 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 26.073 | 13.156 | | 6.004 | | 6.747 | | - | | 6.747 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>3326 / *NSW Rapid Capabilities Development for CIEC* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3326*** | | | | |
| System Development: Technology Assessments/Demonstrations | 1 | 2018 | 4 | 2024 |
| System Development: Test and Evaluations | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604230N / *Warfare Support System* | Project (Number/Name)<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4011: *Naval Coastal Warfare Surv and C4I Sys* | 48.275 | 3.748 | 3.043 | 0.771 | - | 0.771 | 0.792 | 0.808 | 0.821 | 0.838 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Navy Expeditionary project supports the Navy Expeditionary Combat Command (NECC) mission to detect, deter or interdict potential threats to DoN assets using agile, modular and scalable technology. NECC units have a number of current and future Command, Control, Communications, Computers & Intelligence (C4I) technological requirements for Tactical/Command Operations Center, tactical vehicles, combatant craft, and dismounted personnel. NECC operations require units to maintain effective command and control, develop and display a common tactical picture, and share intelligence and current operational information with higher headquarters, subordinate units, joint forces and coalition allies. Small, Medium and Large Scale Communication Systems (LSCS) are the C4I hub for the NECC; Navy Enterprise Tactical Command and Control (NETC2) is the converged LSCS baseline. Future C4I research and development include enhanced information transport, network cyber security posture, cloud-based architecture, assured communications in denied environments along with agility and mobility. Funding also supports testing and evaluation of cyber security issue associated with obsolescence of network items and if not addressed will impact the ability of the Program Office to maintain system accreditation under Risk Management Framework (RMF) revoking multiple LSCS assets authority to connectivity on the Department of Defense Information Network (DoDIN). Efforts are in alignment with NECC's strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities and maintain alignment with greater DoD initiatives, such as Joint Information Environment (JIE), Mission Partner Environment (MPE) in order to maintain interoperability and drive down DoN enterprise costs.

The future of large scale communications assets such as Navy Enterprise Tactical Command and Control (NETC2) (V) 1 and 2, Expeditionary Mine Countermeasures (ExMCM), Assured Command and Control (AC2), will be converging to a Common Expeditionary and Shore Baseline (CESB) culminating in a single RMF Authority to Operate (ATO). Next generation air, surface and subsurface surveillance systems, as well as enhanced C4I capabilities, are required to meet operational objectives. Future technologies are being evaluated as enabling capabilities to expand situational awareness, providing additional tactical decision aids to the local area commander. Future C4I research and development efforts will be identified within NECC strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities to increase agility, mobility and network security posture. Additional efforts will be driven by greater DoD initiatives, such as Joint Information Environment (JIE) Inc II, in order to maintain interoperability and drive down DoN enterprise costs. Funding has been realigned out of PE 0604230N Project 0411, into PE 0604280N as part of RDTEN PE Consolidation starting in FY20.

Identity Dominance System (IDS) supports the Navy's Visit, Board, Search and Seizure (VBSS) teams conducting Expanded Maritime Interception Operations (MIO) with a biometric capability. IDS provides the Navy with a means to collect and process identity information in the conduct of maritime and expeditionary operations. There are three key aspects of this capability: 1) Enable forces to rapidly identify unknown individuals encountered in the conduct of operations. 2) Verify an unknown individual's claimed identity. 3) Enable forces to update, manage, and share identity information on friendly, neutral, and enemy individuals in support of identity

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

operations (IdOps). To support IdOps and achieve identity dominance for expeditionary and naval forces, the future biometrics collection and processing equipment needs to be smaller, lighter, and more efficient with respect to computing power and speed when compared against the current system. The equipment needs to take advantage of enhanced communications capabilities, be able to store the appropriate amount of data to collect biometric samples, match the samples against an internal database and reach near real time operations with connectivity to the DoD biometrics database. In addition to Navy VBSS MIO, IDS also supports the Expeditionary Exploitation Unit One (EXU-1) expeditionary missions. IDS must continue to mature and adapt to the changing threat environment and emerging requirements to support these missions.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Identity Dominance System | 1.247 | 0.748 | 0.771 | 0.000 | 0.771 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The Identity Dominance System (IDS) is facing obsolescence and is scheduled for a technology refresh in FY19 to field a sustainable system, reduce maintenance and sustainment costs, improve system capabilities, and eliminate performance shortfalls. | | | | | |
| ***FY 2019 Plans:***<br>IDS will integrate the government-developed software for technology refresh into a hardware prototype. Tests and<br>evaluations will be conducted to assure compatibility with the software and hardware. Environmental tests will be conducted along with operational tests by users. Software development will continue in order to incorporate different hardware devices and future enhanced modules, peripherals, and newer/cheaper hardware devices. Windows 7 baseline will continue to be updated via Engineering Change Proposals for enhancements and Information Assurance until the Windows 7 baseline system is completely replaced by the tech refresh system. IDS will increase and support the Counter Improvised Explosive Devices (IEDs) and Force Protection efforts to those individuals deployed. The continued efforts of building a database of suspected enemies to the United States will allow potential threats to be identified at foreign access control points and in international waters. Research, Development, Testing and Evaluation efforts will continue to develop and assess upgrades and modifications to keep IDS relevant and effective through follow-on support of Counter-IEDs and Force Protection efforts to those deployed. US Central Command Urgent Operational Needs (UONs) currently exist for biometrics collection capabilities, and requirements continue to grow. Biometrics was highly ranked at both the 2018 Anti-Terrorism Warfare Improvement Program and 2018 Expeditionary Warfare Improvement Program as a Fleet need for future years. Due to the changing threat environment, the need for an enhanced capability has increased. The ability to rapidly collect and identify persons of interest has become a high priority in order to | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| effectively identify threats, increase the security presence at both foreign and domestic access and entry control points, and enhance combat operations.<br>***FY 2020 Base Plans:***<br>IDS will continue to develop Software (S/W) for technology refresh. IDS will support the Hardware (H/W) vendor with First Article Delivery tests to verify delivery is what is needed by the warfighter. IDS will continue to integrate S/W onto H/W. Environmental tests will be completed to confirm that the new device will function in the harsh operational environment. Verification and System tests will be completed to ensure the new device works as intended. Vulnerability tests will continue to be conducted to ensure that both current system and tech refresh system is not vulnerable to cyber attacks. Windows 7 baseline will continue to be updated via Engineering Change Proposals for enhancements and Information Assurance until the Windows 7 baseline system is completely replaced by the tech refresh system. IDS will increase and support the Counter-IED and Force Protection efforts to those individuals deployed. The continued efforts of building a database of suspected enemies to the United States will allow potential threats to be identified at foreign access control points and in international waters.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No significant change from FY 2019 to FY 2020. | | | | | |
| ***Title:*** NECC C4ISR Modernization | 2.501 | 2.295 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Further enhance common baseline via development of Expeditionary Cloud Service Automated Patching/Cloud services and Commercial Solution For Classified Multi-Tenant Environment Replacing Type 1 Encryption. Also, enhance satellite communication Unified Net centric System Modernizing Teleport Step Sites as well as disconnected, intermittent and latent available cloud capabilites.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 0411 as part of PE Consolidation<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 0411. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.748 | 3.043 | 0.771 | 0.000 | 0.771 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/8120: *Maritime Expeditionary Security Force* | 4.010 | 3.576 | 9.503 | - | 9.503 | 6.845 | 7.022 | 7.100 | 7.173 | 0.000 | 157.162 |
| • OPN/8128: *Biometrics* | 0.940 | 2.883 | 2.914 | - | 2.914 | 0.250 | 0.250 | 0.250 | 0.250 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Funding supports an evolutionary acquisition strategy supporting the dynamically evolving rapid action mission of Navy Expeditionary Forces. Small, Medium and Large Scale Communication Systems (LSCS) funding will align LSCS to the Deployable Joint Command and Control (DJC2) product baseline. The project will continuously analyze operational utilization of the systems and will roll analysis results into periodic system upgrades to address cyber security vulnerabilities, obsolescence, and maximize operational effectiveness. The intent of this strategy is to drive down development, production, and logistics costs, while leveraging technologies developed for other agencies to increase the capabilities of Navy Expeditionary Forces. The baseline configuration for Large Scale Communication Systems (LSCS) is the Navy Enterprise Tactical Command and Control (NETC2), a system scalable to Adaptive Force Package (AFP) levels. Efforts include development of capabilities based on emergent requirements, operational feedback, alignment with Dept. of Defense initiatives such as Joint Information Environment (JIE) / Mission Partner Environment, and identification through strategic Expeditionary and Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities to include reach back for tactical vehicles and craft, blue force tracking, tactical data link capability, and sensor technologies in support of surveillance and reconnaissance missions.

Identity Dominance System (IDS) will continue to provide a biometric capability to the Navy's expeditionary/forward deployed forces through system upgrades and further collaboration with other biometric stakeholders. The funding supports development and integration of new capabilities designed to enhance the overall performance of IDS and improve our Nation's security posture abroad and in CONUS. The program continually assesses the threat environment, security posture, operational requirements, and DoD and Navy policies related to Identity Operations and Force Protection. As DOD biometrics requirements continue to grow, new lower cost, more capable technologies are emerging. The program will evaluate, integrate, and field these new capabilities to Maritime and Expeditionary Forces.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

**E. Performance Metrics**

The Navy Expeditionary program continues to identify, evaluate and test a minimum of 3-5 new technologies or configurations per year for potential insertion into the Technical Refresh Plan, to be demonstrated at Fleet Demonstrations.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - Expeditionary | WR | SSC CH : CHARLESTON, SC | 1.985 | 0.387 | Nov 2017 | 0.401 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering - Expeditionary | WR | NSWC : PANAMA CITY, FL | 3.542 | 0.832 | Nov 2017 | 0.762 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 5.136 | Continuing |
| Hardware/Software Development | WR | NSWC DAHLGREN : DAHLGREN | 4.016 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Hardware/Software Development | WR | NSWC CRANE : CRANE | 1.450 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering - IDS | WR | NSWC : DAHLGREN | 6.564 | 0.584 | Oct 2017 | 0.261 | Jan 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Hardware/Software Development - IDS | WR | NSWC : DAHLGREN | 0.000 | 0.232 | Oct 2017 | 0.245 | Jan 2019 | 0.471 | Mar 2020 | - | | 0.471 | Continuing | Continuing | Continuing |
| Hardware/Software Development | C/CPAF | GTRI : ATLANTA, GA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Product Development Prior Years | Various | Various : Various | 10.174 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.174 | 10.174 |
| | | **Subtotal** | 27.731 | 2.035 | | 1.669 | | 0.471 | | - | | 0.471 | Continuing | Continuing | N/A |

**Remarks**

FY20 Navy Expeditionary cost data is provided under PE 0604280N Project 0411

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technical Data | WR | NSWC : CRANE | 0.260 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Technical Data | WR | NSWC : DAHLGREN | 0.187 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Support Prior Years | Various | Various : Various | 5.206 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.206 | 5.206 |
| | | **Subtotal** | 5.653 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604230N / *Warfare Support System* | Project (Number/Name)<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation - IDS | WR | NSWC : DAHLGREN | 0.000 | 0.331 | Jan 2018 | 0.242 | Jan 2019 | 0.300 | Mar 2020 | - | | 0.300 | Continuing | Continuing | Continuing |
| Test & Evaluation - Expeditionary | WR | NSWC : PANAMA CITY, FL | 1.350 | 0.808 | Nov 2017 | 0.614 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.772 | - |
| | | **Subtotal** | 1.350 | 1.139 | | 0.856 | | 0.300 | | - | | 0.300 | Continuing | Continuing | N/A |

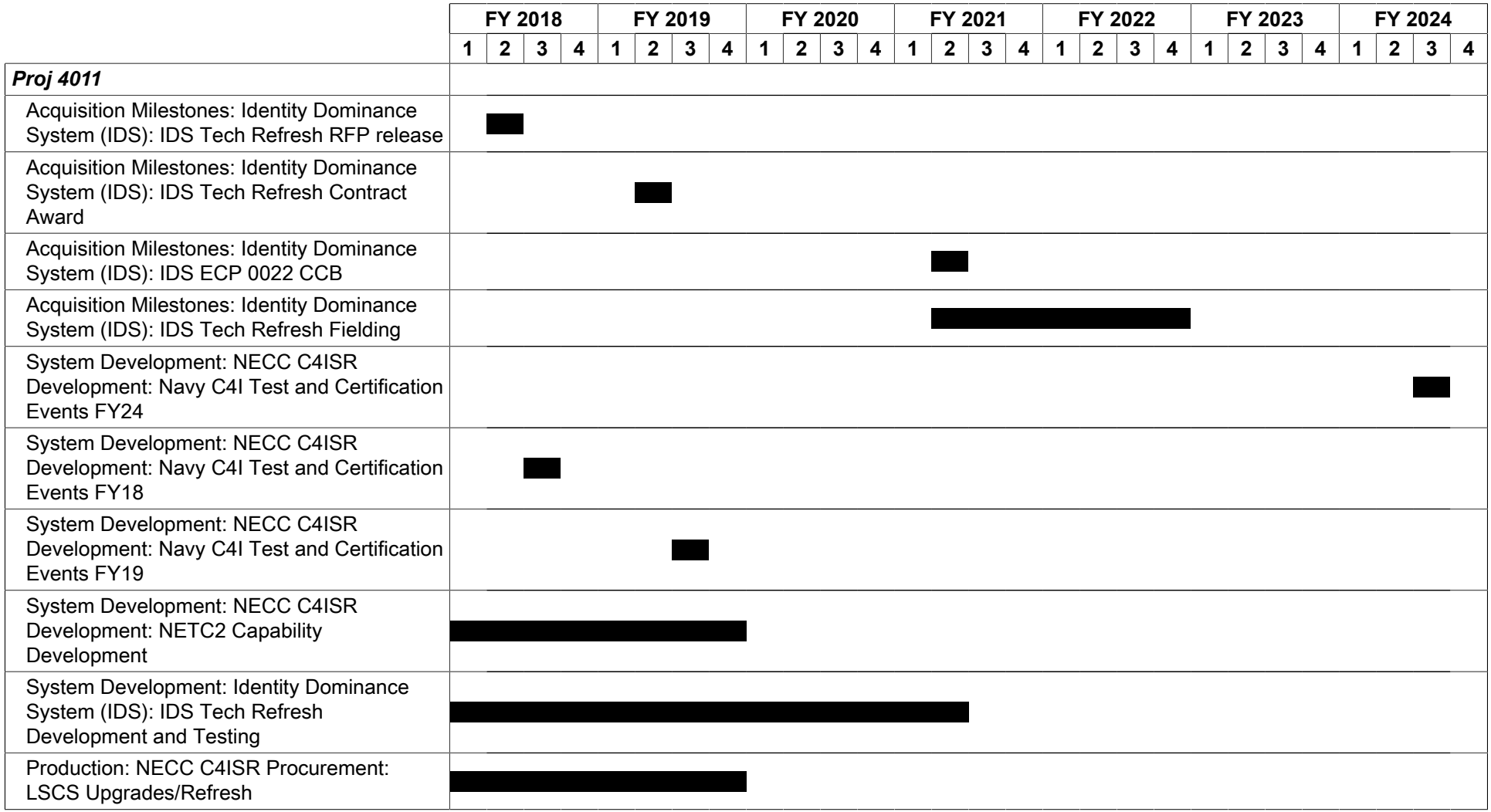
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Services Prior Years | Various | Various : Various | 0.275 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.275 | 0.275 |
| Program Management Support - Expeditionary | WR | SSC CH : CHARLESTON, SC | 0.550 | 0.244 | Nov 2017 | 0.264 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.058 | Continuing |
| Program Management Support - Expeditionary | WR | SSC SD : SSC SAN DIEGO | 1.291 | 0.230 | Nov 2017 | 0.254 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.775 | Continuing |
| Program Management Support | Various | Various : Various | 5.388 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Support - IDS | WR | NSWC : DAHLGREN | 4.975 | 0.100 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Support - IDS | WR | NSWC : CRANE | 1.062 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 13.541 | 0.574 | | 0.518 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

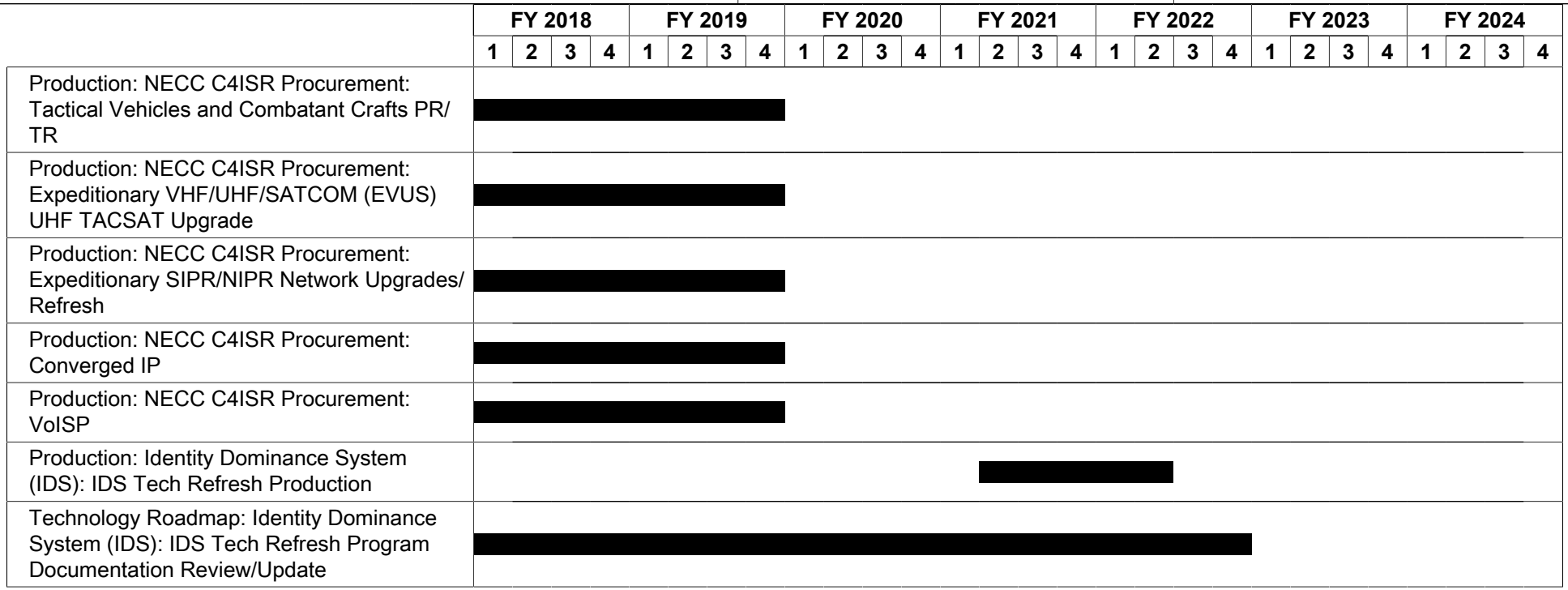
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 48.275 | 3.748 | | 3.043 | | 0.771 | | - | | 0.771 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4011*** | | | | |
| Acquisition Milestones: Identity Dominance System (IDS): IDS Tech Refresh RFP release | 2 | 2018 | 2 | 2018 |
| Acquisition Milestones: Identity Dominance System (IDS): IDS Tech Refresh Contract Award | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: Identity Dominance System (IDS): IDS ECP 0022 CCB | 2 | 2021 | 2 | 2021 |
| Acquisition Milestones: Identity Dominance System (IDS): IDS Tech Refresh Fielding | 2 | 2021 | 4 | 2022 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY24 | 3 | 2024 | 3 | 2024 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY18 | 3 | 2018 | 3 | 2018 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY19 | 3 | 2019 | 3 | 2019 |
| System Development: NECC C4ISR Development: NETC2 Capability Development | 1 | 2018 | 4 | 2019 |
| System Development: Identity Dominance System (IDS): IDS Tech Refresh Development and Testing | 1 | 2018 | 2 | 2021 |
| Production: NECC C4ISR Procurement: LSCS Upgrades/Refresh | 1 | 2018 | 4 | 2019 |
| Production: NECC C4ISR Procurement: Tactical Vehicles and Combatant Crafts PR/ TR | 1 | 2018 | 4 | 2019 |
| Production: NECC C4ISR Procurement: Expeditionary VHF/UHF/SATCOM (EVUS) UHF TACSAT Upgrade | 1 | 2018 | 4 | 2019 |
| Production: NECC C4ISR Procurement: Expeditionary SIPR/NIPR Network Upgrades/ Refresh | 1 | 2018 | 4 | 2019 |
| Production: NECC C4ISR Procurement: Converged IP | 1 | 2018 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production: NECC C4ISR Procurement: VoISP | 1 | 2018 | 4 | 2019 |
| Production: Identity Dominance System (IDS): IDS Tech Refresh Production | 2 | 2021 | 2 | 2022 |
| Technology Roadmap: Identity Dominance System (IDS): IDS Tech Refresh Program Documentation Review/Update | 1 | 2018 | 4 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604230N / *Warfare Support System* | Project (Number/Name)<br>9C86 / *Combatant Craft Replacement* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9C86: *Combatant Craft Replacement* | 7.763 | 2.100 | 0.682 | 1.083 | - | 1.083 | 1.204 | 0.942 | 0.904 | 0.922 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Navy Expeditionary Combat patrol boat, Fleet Expeditionary Security combatant craft, Underwater Construction Team (UCT) and Explosive Ordnance Disposal (EOD) replacements will provide second generation Multi Mission Craft that will replace in-service Force Protection Large, Force Protection Small, Riverine Patrol Boats (RPBs), Riverine Assault Boats (RABs), Underwater Construction and EOD craft. Boat and craft replacements will: conduct Maritime Security Operations across the full spectrum of naval, joint, and combined operations enabling access and freedom of action throughout the sea-to-shore and inland operating environments as well as conduct maritime Mine Countermeasures (MCM), counter Improvised Explosive Devices (IEDs), Weapons of Mass Destruction (WMD), and all other types of weaponry, for protection of naval and joint assets required for sea control and power projection. Specific mission and capabilities will be identified in an Initial Capabilities Document (ICD), Analysis of Alternatives (AoA), Capabilities Production Document (CPD) and required milestone documentation. RDT&E funding will fund procurement and material solution studies, advanced technology development and studies, design development and test and evaluation.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Combatant Craft Replacement | 2.100 | 0.682 | 1.083 | 0.000 | 1.083 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The boats and craft in the Navy Expeditionary Combat Command (NECC) fleet are reaching the end of their service lives and will create a capability gap if not replaced. Funding supports design/development and testing of NECC's next generation Expeditionary Combat Patrol Boat or 40 Patrol Boat (40PB) and other NECC craft. | | | | | |
| ***FY 2019 Plans:***<br>Conduct developmental testing and operational test development for 40PB in support of NECC craft recapitalization.<br>Continuing material solution development and advanced technology development as well as beginning planning, research, analysis, design and development to recapitalize other NECC craft. Continue science and technology development work to optimize material solutions to fill critical NECC capability gaps. | | | | | |
| ***FY 2020 Base Plans:***<br>Continuing material solution development and advanced technology development as well as beginning planning, research, analysis, design and development to recapitalize other NECC craft. Continue science and technology | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>9C86 / *Combatant Craft Replacement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| development work to optimize material solutions to fill critical NECC capability gaps. Begin development of lethal and non-lethal sensors/effectors.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 funding increase in support of Combatant Craft Replacement. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.100 | 0.682 | 1.083 | 0.000 | 1.083 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/1210: *Standard Boats (NECC)* | 29.131 | 29.479 | 29.220 | - | 29.220 | 11.320 | 11.546 | 11.776 | 12.012 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Acquisition of RDT&E developed craft material solution and technology to be accomplished using "tailored" commercial procurements in accordance with a PMS325G approved/OPNAV N95 endorsed NECC Craft Replacement Acquisition Strategy.

**E. Performance Metrics**

Successfully demonstrate system functionality to support approved requirements and Initial Capabilities Document (ICD).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604230N / *Warfare Support System* | Project (Number/Name)<br>9C86 / *Combatant Craft Replacement* | |

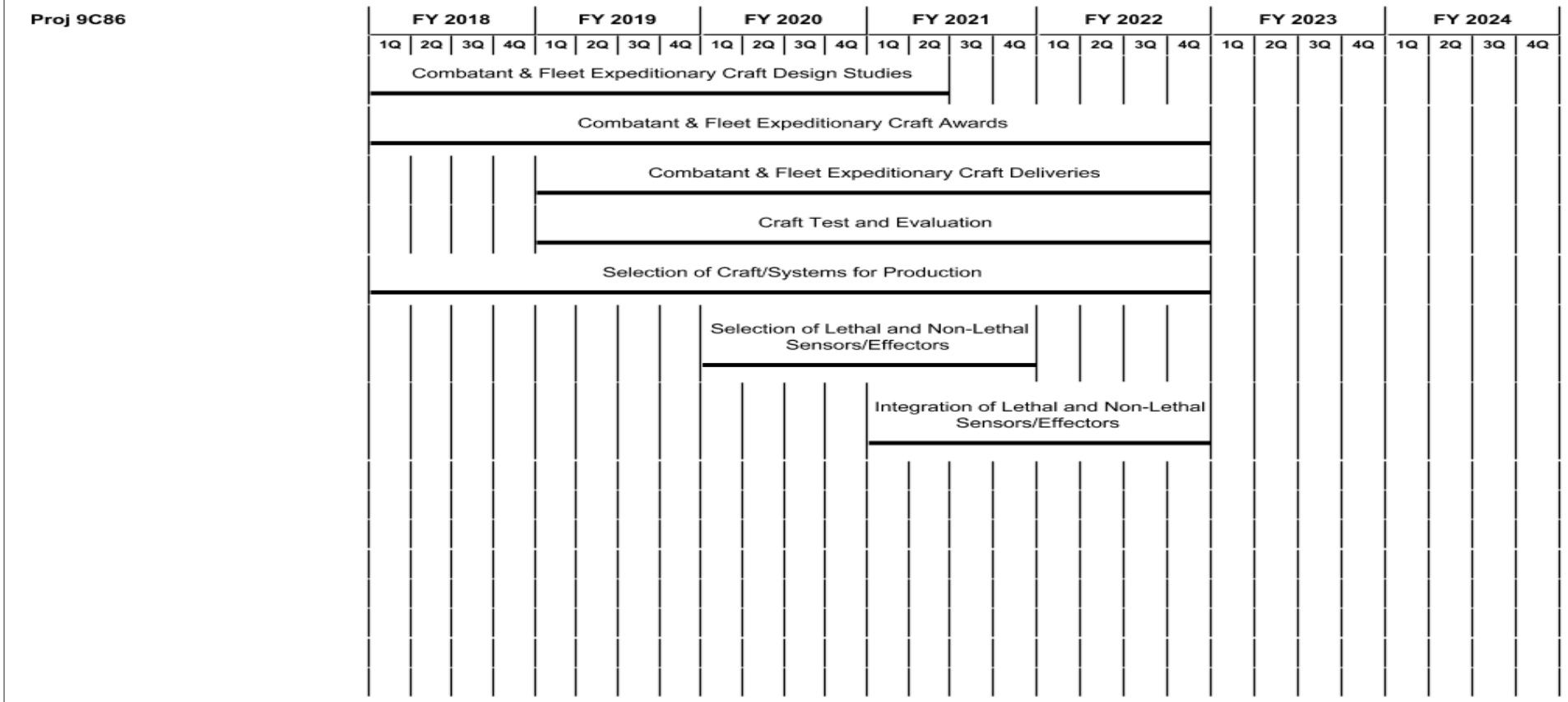
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Craft Feasibility Study | WR | NSWC : Carderock, MD | 1.912 | 0.399 | Mar 2018 | 0.130 | Mar 2019 | 0.206 | Mar 2020 | - | | 0.206 | Continuing | Continuing | Continuing |
| Craft Material Solution & Design Development | WR | NSWC : Carderock, MD | 3.921 | 1.302 | Mar 2018 | 0.422 | Mar 2019 | 0.671 | Mar 2020 | - | | 0.671 | Continuing | Continuing | Continuing |
| Craft Study Report | WR | NSWC : Carderock, MD | 1.930 | 0.399 | Mar 2018 | 0.130 | Mar 2019 | 0.206 | Mar 2020 | - | | 0.206 | Continuing | Continuing | Continuing |
| Craft Test and Evaluation | WR | NSWC : Carderock, MD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 7.763 | 2.100 | | 0.682 | | 1.083 | | - | | 1.083 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7.763 | 2.100 | | 0.682 | | 1.083 | | - | | 1.083 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>9C86 / *Combatant Craft Replacement* |




*2020DON - 0604230N - 9C86*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604230N / *Warfare Support System* | **Project (Number/Name)**<br>9C86 / *Combatant Craft Replacement* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9C86*** | | | | |
| Combatant & Fleet Expeditionary Craft Design Studies | 1 | 2018 | 2 | 2021 |
| Combatant & Fleet Expeditionary Craft Awards | 1 | 2018 | 4 | 2022 |
| Combatant & Fleet Expeditionary Craft Deliveries | 1 | 2019 | 4 | 2022 |
| Craft Test and Evaluation | 1 | 2019 | 4 | 2022 |
| Selection of Craft/Systems for Production | 1 | 2018 | 4 | 2022 |
| Selection of Lethal and Non-Lethal Sensors/Effectors | 1 | 2020 | 4 | 2021 |
| Integration of Lethal and Non-Lethal Sensors/Effectors | 1 | 2021 | 4 | 2022 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604231N *I Tactical Command System* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 546.263 | 37.609 | 54.300 | 77.232 | - | 77.232 | 73.081 | 53.427 | 47.032 | 47.987 | Continuing | Continuing |
| 0486: *Tactical Support Center* | 134.630 | 4.780 | 4.645 | 6.092 | - | 6.092 | 5.991 | 5.722 | 5.837 | 5.952 | Continuing | Continuing |
| 2343: *Tactical METOC Applications* | 0.000 | 0.000 | 0.000 | 12.198 | - | 12.198 | 12.052 | 12.644 | 13.913 | 14.196 | Continuing | Continuing |
| 2345: *Fleet METOC Equipment* | 0.000 | 0.000 | 0.000 | 0.220 | - | 0.220 | 0.620 | 0.577 | 0.487 | 0.496 | Continuing | Continuing |
| 2363: *Remote Sensing Capability Development* | 0.000 | 0.000 | 0.000 | 5.651 | - | 5.651 | 7.448 | 4.862 | 4.740 | 4.838 | Continuing | Continuing |
| 3032: *NTCSS (Naval Tactical Command Spt Sys)* | 97.905 | 4.455 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 102.360 |
| 3050: *Deployable JT Command and Control* | 0.000 | 0.000 | 0.000 | 3.159 | - | 3.159 | 3.225 | 3.299 | 3.363 | 3.431 | Continuing | Continuing |
| 3260: *Naval Operations Business Logistics Enterprise (NOBLE)* | 0.000 | 12.656 | 34.491 | 38.366 | - | 38.366 | 32.249 | 14.276 | 6.346 | 6.480 | Continuing | Continuing |
| 3323: *Maritime Tactical Command & Control (MTC2)* | 59.856 | 12.885 | 11.951 | 8.659 | - | 8.659 | 8.761 | 9.035 | 9.275 | 9.461 | Continuing | Continuing |
| 3324: *Navy Air Operations Command and Control (NAOC2)* | 14.044 | 0.831 | 1.004 | 0.708 | - | 0.708 | 0.514 | 0.744 | 0.759 | 0.774 | Continuing | Continuing |
| 9123: *FORCEnet* | 239.828 | 2.002 | 2.209 | 2.179 | - | 2.179 | 2.221 | 2.268 | 2.312 | 2.359 | Continuing | Continuing |

**Note**

To ensure resources are aligned to enable rapid capability delivery, funding has been realigned into PE 0604231N from the following Program Elements/Projects as part of the RDTEN PE Consolidation starting in FY20: PE 0604218N Project 2343, Tactical METOC Applications; PE 0604218N Project 2345, Fleet METOC Equipment; PE 0604218N Project 2363, Remote Sensing Capability Development; PE 0607700N Project 3050, Deployable JT Command and Control. There are no New Starts associated with PE Consolidation.

**A. Mission Description and Budget Item Justification**

The Tactical Command System upgrades the Navy's Command, Control, Communications, Computer and Intelligence (C4I) systems and processes C4I information for all warfare mission areas including planning, direction and reconstruction of missions for peacetime, wartime and times of crises.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* |

(Proj 0486) Tactical Support Center: The Tactical Mobile program provides agile evolutionary systems and equipment upgrades to support the Maritime Patrol and Reconnaissance Force Commanders with the capability to plan, direct and control the tactical operations of Maritime Patrol and Reconnaissance Aircraft and other assigned units within their respective area of responsibility. Looking ahead, TacMobile provides critical mission planning and reach-back capabilities between the Maritime Patrol and Reconnaissance Aircraft, primarily the P-8A/Poseidon, and MQ-4C/Triton, and the Maritime Intelligence Surveillance and Reconnaissance Enterprise. These operations include littoral, open ocean, and over land long-dwell surveillance, anti-surface warfare, over-the-horizon targeting, counter-drug operations, power projection, antisubmarine warfare, mining, search and rescue, indications and warning, realtime full motion video collection and streaming/ dissemination, and special operations. The missions are supported by Tactical Operations Centers, Mobile Tactical Operations Centers, and Fly Away Kits.

(Proj 2343,2345,2363) Tactical METOC Applications; Fleet METOC Equipment, and Remote Sensing Capability Development: The Air/Ocean Equipment Engineering (AOEE) projects provide new capabilities to support naval combat forces. This program engineers and developmentally tests organic and remote sensors, communication interfaces, and processing and display devices. This equipment is engineered to measure, ingest, store, process, distribute and display conditions of the physical environment that are essential to the optimum employment and performance of naval warfare systems. AOEE also engineers capabilities for shipboard and shore-based tactical systems. A major area of focus for the AOEE program is to provide the engineering development of specialized equipment and measurement capabilities that are intended to monitor specific conditions of the physical environment in hostile and remote areas in response to fleet demand signals for increased sensing capability and capacity to support battlespace collections and prediction on short to intermediate time scales. With such capabilities, the war fighters' situational awareness of the operational effects of the physical environment are made more certain. Efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion.

Major emphasis areas include the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) project (2343), Littoral Battlespace Sensors - Unmanned Undersea Vehicles (LBS-UUV) project (2345), and the Remote Sensing Capability Development (RSCD) project (2363).

(Proj 3032) Naval Tactical Command Support System (NTCSS): The NTCSS is a multi-function program designed to provide standard tactical support information systems to various afloat and associated shore-based fleet activities. The mission is to provide the Navy and Marine Corps with an integrated, scalable system that supports the management of logistical information, personnel, material and funds required to maintain and operate ships, submarines, and aircraft.

(Proj 3050) Deployable Joint Command and Control (DJC2) provides a self-contained, standardized, rapidly deployable, modular, scalable, and reconfigurable joint command and control (C2) capability to designated Geographic Combatant Commands (GCCs). DJC2 is the materiel solution to Defense Planning Guidance that called for the development of standing Joint Task Forces (JTFs) with a deployable C2 capability. DJC2 will ensure that Joint Force Commanders (JFC) are equipped, as well as trained and organized, to carry out their C2 responsibilities. DJC2 provides GCCs and JFCs a mission critical, integrated family of systems with which to plan, control, coordinate, execute, and assess operations. It is designed to deploy rapidly, set up within hours, and quickly provide necessary C2 mission and collaboration functionality across the full spectrum of JTF operations. The DJC2 has also been deployed in support of Humanitarian Assistance and Disaster Relief (HA/DR) efforts. The capability is intended for all levels of conflict and will be reconfigurable to meet specific GCC and JTF mission requirements. This capability is interoperable with higher and adjacent echelons of command (to include coalition allies) as well as with supporting elements to include joint forces.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* |

(Proj 3260) The Naval Operational Business Logistics Enterprise (NOBLE): family of programs will provide direct support to warfighter readiness with maintenance, supply, and personnel administration capabilities using an open architecture framework that incorporates business process re-engineering (BPR) allowing for the consolidation of over 23 standalone application systems. These capabilities include enhanced situational awareness, planning, execution, personnel administration, and management of maintenance and supply logistics and business functions to ships/submarines, aviation squadrons, shore operational sites, and expeditionary units with a total user base exceeding 150,000. NOBLE will meet current and emerging demands for cyber, Financial Improvement and Audit Readiness (FIAR), Navy logistics and maritime maintenance mission requirements, and eliminate over 700 application/database servers. NOBLE will deploy to Navy Enterprise Data Centers (NEDC) ashore, the Consolidated Afloat Networks and Enterprise Services (CANES) afloat, and Department of the Navy (DON) commercial cloud computing environments.

(Proj 3323) Maritime Tactical Command and Control (MTC2): is a next generation Command and Control (C2) software program that will deliver Battle Management Aids (BMA) and Maritime Planning Tools (MPT) to dynamically plan, direct, monitor, and assess maritime operations in support of Joint, Multi-Service, and Coalition Force planning. MTC2 will leverage a System of Services (SoServ) to deliver capabilities improving decision speed and dynamic synchronization of forces. BMAs / MPTs are small, capability-focused deliveries that can be rapidly developed, tested, and fielded. MTC2 will engage with the Office of the Chief of Naval Operations (OPNAV)-led and Fleet supported Requirements Governance Board (RGB) to define and prioritize the BMAs and MPTs that MTC2 will deliver and align to the Program Executive Office (PEO) Command, Control, Communications, and Intelligence (C4I) enterprise architecture Consolidated Afloat Network Enterprise Service (CANES), Agile Core Services (ACS)) for fielding to all echelons of command (Afloat and Ashore) within the Navy. The program's objective is to provide a suite of maritime applications (BMAs / MPTs) that enable planning, execution, monitoring, and assessment in support of operational and tactical level of war requirements. MTC2 will field BMAs / MPTs designed to provide automated and structured support for tactical and operational planning, decision-making, and execution. MTC2 will incorporate distributed data transfer capability for enhanced operational data exchange between command and control systems, combat systems, logistics, and intelligence systems for timely threat identification, location, and status alongside blue force data. MTC2 is the Navy's only solution to fulfill a portion of the Joint Global Force Management - Data Initiative (GFM-DI) Allocation requirements. GFM-DI is the Department-wide enterprise solution that enables visibility/accessibility/sharing of data applicable to the entire Department of Defense (DoD) force structure.

(Proj 3324) Navy Air Operations Command and Control (NAOC2): NAOC2 integrates and tests Air Force program of record systems that provide an integrated and scalable planning system for standardized, secure, and automated decision support for Air Force, Joint, and Allied commanders worldwide. These programs provide automated air operations planning, execution management and intelligence capabilities at the Force level to include fleet commanders, numbered fleet commanders, Commander Carrier Strike Groups, Commander Expeditionary Strike Groups, Commander Landing Forces, and Joint Task Force Commanders. NAOC2 includes Theater Battle Management Core System (TBMCS) and Command and Control Air Operations Suite - Command and Control Information Services (C2AOS-C2IS). C2AOS-C2IS is comprised of multiple projects incorporated into three Capability Packages and will deploy to a Service Oriented Architecture (SOA) enterprise environment that aligns with the Joint C2 Reference Architecture (JC2RA) such as Consolidated Afloat Networks and Enterprise Services (CANES). C2AOS-C2IS is not natively compatible with Navy Information Technology (IT) infrastructure, such as CANES, and requires a significant level of system integration. Continuation of Navy integration and test efforts will significantly enhance the ability of the Joint Force Air Component Commander and Combined Air Operations Center personnel to plan daily air operations including strike, airlift, offensive/defensive air, missile defense, and refueling missions in support of combat operations. Developmental Testing of the C2AOS-C2IS program will be continued for new technology insertion into Navy infrastructure network and hardware in support of Naval Air C2 and Net Enabled Weapons system integration. C2AOS-C2IS addresses the requirement of war fighter distributed planning and execution processes along with significantly improving

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604231N *I Tactical Command System* |

Joint interoperability. TBMCS continues a hardware transition to CANES. Currently, TBMCS is the key system that is used to conduct real world air planning in the Joint and Navy environments. C2AOS-C2IS will replace TBMCS while bringing more flexibility to the war fighter.

(Proj 9123) FORCEnet: The mission of this effort is to deliver Information Dominance by (a) accelerating the transformation to a Distributed, Networked force; (b) achieve interoperability based on Architectures and Standards; and (c) Experiment with, evaluate and employ the enabling technologies. Effort is a non-acquisition program that is the operational instantiation of FORCEnet. The end-state is a distributed network of weapons, sensors, Command and Control (C2), platforms and warriors.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 55.695 | 57.688 | 58.544 | - | 58.544 |
| Current President's Budget | 37.609 | 54.300 | 77.232 | - | 77.232 |
| Total Adjustments | -18.086 | -3.388 | 18.688 | - | 18.688 |
| • Congressional General Reductions | - | -0.087 | | | |
| • Congressional Directed Reductions | - | -3.301 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.758 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.900 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 18.767 | - | 18.767 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.079 | - | -0.079 |
| • Congressional General Reductions Adjustments | -0.172 | - | - | - | - |
| • Congressional Directed Reductions Adjustments | -18.772 | - | - | - | - |

**Change Summary Explanation**

Technical: Not applicable.

SCHEDULE:

Tactical Support Center (Project 0486):
FY2020 funding continues to support Systems Engineering and Primary Hardware Development as TacMobile conducts Critical Design Review (CDR) for Increment 3, to support ACAT I P-8A Increment 3 Developmental and Integrated Test events beginning in FY21. Specific efforts include integration of design upgrades to TacMobile capabilities for P-8A Applications Based Architecture (ABA) and incorporating design upgrades to the TacMobile Engineering Development Model with appropriate P-8A interfaces to enable Systems Integration Testing of net-ready applications, mission planning and post-flight test

threads; Systems Integration Testing of TacMobile interfaces for P-8A Anti-Submarine Warfare (ASW) Signals Intelligence (SIGINT); Systems Integration Testing of Multiple Security Level enclaves, and common solution interoperability with P-8A security interfaces. NAVAIR has assumed the lead systems integrator role for design and development of P-8A Increment 3, and therefore there will be heavy reliance upon TacMobile to align to and be an integral part of Developmental and Integrated test events for P-8A to meet critical aircraft integration and testing milestones.

Naval Tactical Command Support System (NTCSS) (Project 3032):
Beyond Capability of Maintenance Interdiction (BCM-I) / Global Individual Component Repair List (G-ICRL):
Developmental Test (DT) plan involved testing at three operational units; Marine Aviation Logistics Squadron 29 (MALS-26), Fleet Readiness Center Mid-Atlantic (FRCMA) Oceana; and the USS Bataan (LHA-5) in Q2 of FY17. Several software issues were discovered that required additional development work, resulting in a delay to the testing until Q3FY17. Successfully completed MALS-29 and FRCMA DT in Q4FY17, but due to the delayed start the USS Bataan had to be delayed until they returned in late Q1FY18 resulting in a Fielding decision in Q2FY18.

Table of Allowance & Personal Gear Issue (TOA/PGI):
Due to additional requirements for disconnected operations being identified by the fleet to support TOA/PGI operations, the Fielding Decision (FD) was delayed until Q3FY19 to support hardware procurements for mobile computing devices and additional time to configure the software to support those devices.

Naval Operational Business Logistics Enterprise (NOBLE) (Project 3260): Acquisition strategy changed to leveraging the FY-16 National Defense Authorization Act which allows DOD to use transactions other than contracts, cooperative agreements or grants to "carry out prototype projects that are directly relevant to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components, or materials proposed to be acquired or developed." This strategy provides risk reduction by ensuring the vendor solution demonstrates the capability before the government enters into a production contract and will allow us to pull the NAMS and NOME schedules left in alignment with the NOSS schedule and accelerating delivery of the NOBLE Family of Systems (FoS) capabilities more rapidly.

Navy Air Operations Command and Control (NAOC2)(Project 3324):
Multi-Service Operational Test and Evaluation (MOT&E) Phase 2/Afloat Operational Test (OT) moved to the right one quarter to align with United States Air Force (USAF) schedule. Airspace Management Application/Airspace Information service (ASMA-ASIS) Battle Management Aid (BMA) development schedule adjusted because of delays in technical development schedule.

FUNDING:

Tactical METOC Applications (Project 2343):

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|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604231N *I Tactical Command System* |

Funding has been realigned into PE 0604231N from PE 0604218N Project 2343 as part of RDTEN PE Consolidation starting in FY20, $12.198M. There are no New Starts associated with this realignment. FY2020 funding request was reduced in Project 2343 by ($2.398M) to account for availability of prior year balances.

Fleet METOC Equipment (Project 2345):
Funding has been realigned into PE 0604231N from PE 0604218N Project 2345 as part of RDTEN PE Consolidation starting in FY20, $.220M. The FY 2020 funding request was reduced by $0.478M to account for availability of prior year balances.

Remote Sensing Capability Development (RSCD) (Project 2363):
Funding has been realigned into PE 0604231N from PE 0604218N Project 2363 as part of RDTEN PE Consolidation starting in FY20, $5.651M. The FY2020 funding request was reduced by $1.266M to account for availability of prior year balances.

Naval Tactical Command Support System (NTCSS) (Project 3032):
Funding in Project 3032 ends in FY2018 as NTCSS transitioned development of tactical support information systems to the Naval Operational Business Logistics Enterprise (NOBLE).

Deployable JT Command and Control (Project 3050)
Funding has been realigned into PE 0604231N from PE 0607700N Project 3050 as part of RDTEN PE Consolidation starting in FY20, $3.159M.

Naval Operational Business Logistics Enterprise (NOBLE) (Project 3260):
FY2020 funding increase supports:
Naval Operational Supply System (NOSS) / Naval Aviation Maintenance System (NAMS) / Naval Operational Maintenance Enterprise (NOME): Increases are due to increased software development and engineering efforts associated with the Acquisition Testing & Deployment phase for the NOSS, NAMS and NOME capabilities. Each program has a unique set of requirements with NOSS being the most complex as it includes the Cloud Hosting/Integrated Data Environment (IDE) solution, followed by NAMS and with NOME being the least mature in the Acquisition Testing & Deployment phase. As such, funding has been allocated accordingly based on requirements and schedule.

Naval Administration and Personnel System (NAPS): FY2018 funding marked due to lack of requirements definition. Additional funding and efforts will be on hold pending the identification of resource sponsor to validate/fund program requirements.

Maritime Tactical Command and Control (MTC2) (Project 3323):
FY2019 to FY2020 funding for MTC2 decreases due to direction to align to the new program scope per the Strategic Shift Memo from the Office of the Chief of Naval Operations (OPNAV) dated 28 NOV 2016. In order to meet OPNAV's redirection, the program was required to re-baseline in order to focus on delivery of Battle Management Aids (BMA) / Maritime Planning Tools (MPT). Prototype development, integration, and testing for BMAs and MPTs extended one quarter due to revised completion date estimate for the Authority to Operate (ATO). Annual Delivery 2 (Capability Drop 2) was defined in the MTC2 Requirements Governance Board (RGB) Prioritized Focus Areas (signed 16 March 2018) to provide Navy Dynamic Organization to Joint GFM community. This capability drop

has been accelerated to meet the DoD Joint GFM-DI Allocation mandate to Full Operational Capability (FOC) by FY20. Future annual deliveries shown in R-4 schedule are notional deliveries that will be defined in future RGBs.

FORCEnet (Project 9123):
From FY19 to FY20 funding decrease attributed to efficiencies identified while assessing Information Warfare capability/Science and Technology gaps in the context of assessed mission areas.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | | | | Project (Number/Name)<br>0486 / *Tactical Support Center* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 0486: *Tactical Support Center* | 134.630 | 4.780 | 4.645 | 6.092 | - | 6.092 | 5.991 | 5.722 | 5.837 | 5.952 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

TacMobile brings Enterprise Command, Control, Communications, Computers and Intelligence, Surveillance and Reconnaissance (C4ISR) to the Maritime Patrol and Reconnaissance Force (MPRF) community.

TacMobile is a long-running, multi-year acquisition program which provides Command, Control, Communications, Computers, and Intelligence (C4I) for Navy's Maritime Patrol and Reconnaissance Force (MPRF). From within Tactical Operations Centers (TOC) at well-supported airfields, TacMobile provides theater Anti-Submarine Warfare (ASW) and Intelligence Surveillance Reconnaissance (ISR) commanders a common tactical picture while providing pre-flight and post-flight support to manned and unmanned MPRF aircraft. From within Mobile Tactical Operations Centers (MTOC), TacMobile supports manned MPRF aircraft at the tactical edge of operations. TacMobile Fly-Away Kits (FAK) support manned MPRF aircraft in short-duration expeditionary settings.

Services provided include analysis and correlation of diverse sensor information; data management support; command decision aids; rapid data communication; mission planning, evaluation and reach-back dissemination of surveillance data and threat alerts to operational users ashore and afloat, and to the Maritime Intelligence Surveillance and Reconnaissance Environment.

TOCs provide Command, Control, Communications, Computers and Intelligence (C4I) capability, air-ground, satellite and point-to-point communications systems; sensor analysis capabilities; avionics and weapons system interfaces and facilities equipment. MTOCs are scalable, mobile versions for operations from remote forward operating airfields. FAKs provide additional agility for expeditionary short-term duration aircraft detachments. This program assures that existing TOCs and MTOCs are interoperable to fulfill their operational requirements. TOC/MTOC will continue to provide the ground Command and Control missions, reach-back and C4I interfaces for the MPRF Family of Systems (FOS) aircraft and systems evolution including P-8A Multi-mission Maritime Aircraft (MMA) baseline and Increment 2, and the development of future C4I support capabilities for the P-8A Poseidon Increment 3, Advanced Airborne Sensor (AAS), and the MQ-4C TRITON Unmanned Aerial System.

The TacMobile program follows an Evolutionary Acquisition approach for adding capabilities that maintain and support MPRF weapons systems. Current requirements for TacMobile are to adapt to a smaller, lightweight, scalable Network-centric Services Oriented Architecture (SOA) configuration. Additional TacMobile requirements are to simplify and streamline the Pre-Flight Insertion Data (PID) process for mission aircraft, and to satisfy the need for sensor data sharing between aircraft and the Maritime Intelligence Surveillance and Reconnaissance Enterprise.

FY20: Funding supports core TacMobile systems engineering, development and testing of Increment 3, and Technical Refresh to Increment 2.1, to maintain interoperability with P-8A Poseidon and the MQ-4C Triton. Specifically this development is aligned to support P-8A Inc 3 Block 2 Integrated Testing beginning in FY20, increase modularity, establish additional security enclaves and reduce footprint to offset the size/weight/power/cooling (SWaP-C) of additional required aircraft interfaces developed to support P-8A Increment 3, Advanced Airborne Sensor (AAS) and emerging Maritime Patrol and Reconnaissance Aircraft operations. Network-centric Services Oriented Architecture (SOA) and airborne C4I integration efforts continue to ensure interoperability with emerging MPRF Aircraft and Sensors, streamline Pre-

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

Flight Insertion Data (PID), facilitate the MPRF ISR and ASW data Processing - Exploitation - Dissemination (PED) process, and reduce TacMobile footprint, enhancing mobility capabilities.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** TacMobile Increment 2.1 | 1.296 | 0.991 | 0.953 | 0.000 | 0.953 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete phased design and engineering of Technical refresh 2.1.2, including P-8A/Poseidon and MQ-4C/ Triton interoperability related communications upgrades (Global Broadcast System (GBS), Super High Frequency (SHF) and Tactical Data Links (TADIL); Command, Control, Communications and Intelligence (C4I) enhancements (Common Operational Picture (COP) and Integrated Broadcast Service (IBS)), and appropriate subsystem refreshes based on P-8A and MQ-4C collaborative efforts. These efforts include:<br>INTEROPERABILITY: Complete Automated Digital Network System (ADNS) and Full Motion Video implementations following external stakeholder transition to ADNS Inc 3 infrastructure - (TR 2.1.1/2.1.2).<br>SYSTEM UPGRADES: Continue design model development of automated TacMobile system functionality to reduce operator workload, increase agility with Size / Weight /Power/Cooling (SWaP-C) reductions, and offset increasing Maritime Patrol and Reconnaissance Force Intelligence Surveillance and Reconnaissance Mission/Function/Task - (TR 2.1.2); Implement fleet change requests into Technical Refresh 2.1.2 - (TR 2.1.2).<br>MODERNIZATION: Integrate selected option for Global Broadcast System subsystem modernization - (TR 2.1.2); Integrate selected option for SHF subsystem modernization - (TR 2.1.2); Complete communications upgrade design/integration/development for P-8A interoperability and optimization: Common Data Link Upgrades, Broadcast Intelligence Analysis, Joint Range Extension, Third Party Targeting, High Frequency Internet Protocol, Link 16 updates, and Wideband SatCom design/technology implementation - (TR 2.1.2); Complete integration of selected solution to modernize or replace current generation Global Command and Control System Maritime - (TR 2.1.2); Integrate next generation Mass Storage solution - (TR 2.1.2). | | | | | |
| ***FY 2020 Base Plans:***<br>Complete development of Super High Frequency (SHF) and Tactical Data Links (TADIL), Command, Control, Communications and Intelligence (C4I) enhancements (Common Operational Picture (COP) and Integrated Broadcast Service (IBS)), and appropriate subsystem refreshes based on P-8A and MQ-4C collaborative efforts and made ready for fielding. These efforts include:<br><br>INTEROPERABILITY: Complete Automated Digital Network System (ADNS) and PCDL Full Motion Video implementations TR 2.1.2. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| SYSTEM UPGRADES: Continue iterative design model development of automated TacMobile system functionality to be carried into Increment 3.0, to reduce operator workload, increase agility with Size / Weight / Power/Cooling (SWaP-C) reductions, and offset increasing Maritime Patrol and Reconnaissance Force Intelligence Surveillance and Reconnaissance Mission/Function/Task TR 2.1.2; Continue to incorporate fleet change requests into Technical Refresh 2.1.2 - (TR 2.1.2).<br><br>MODERNIZATION: Complete integration of selected option for Global Broadcast System subsystem modernization - (TR 2.1.2); Complete integration and testing of selected option for SHF subsystem modernization - TR 2.1.2; Continue communications upgrade design/integration/development for P-8A interoperability and optimization: Common Data Link Upgrades, Broadcast Intelligence Analysis, Joint Range Extension, Third Party Targeting, High Frequency Internet Protocol, Link 16 updates, and Wideband SatCom design/technology implementation - (TR 2.1.2); Continue with integration and development of P8-A interoperability, C4I refresh, storage modernization, network refresh (including Cyber upgrades), and power distribution system upgrades. Complete integration of selected solution to modernize or replace current generation Global Command and Control System Maritime - (TR 2.1.2); Continue integration and development of the next generation Mass Storage solution - (TR 2.1.2). Analyze and assess options to defer integration of solutions to modernize or replace current generation Global Command and Control System Maritime from TR 2.1.2 to Inc 3.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Minor FY20 funding decrease for TacMobile Increment 2.1 development is due to reduction of effort associated with beginning ramp down /completion of TR 2.1.2 development/integration. | | | | | |
| ***Title:*** TacMobile Increment 3.0 | 3.484 | 3.654 | 5.139 | 0.000 | 5.139 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>INTEROPERABILITY: Finalize Engineering Development Model (EDM) design to include appropriate interfaces for P-8A - (Inc 3.0); Finalize design for Multiple Security Level enclaves and joint system security architecture for P-8A interoperability - (Inc 3.0); Finalize EDM architecture to support Navy Tasking, Collection, Processing, Exploitation, and Dissemination CONOPS and data reach-back requirements for integrating the wide range of P-8A missions and Anti-Submarine Warfare and Intelligence Surveillance and Reconnaissance data elements with the Maritime Intelligence Surveillance and Reconnaissance Environment - (Inc 3.0); Finalize EDM design | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and data strategy to maximize automation, Services Oriented Architecture (SOA), virtualization for increased interoperability and efficiency - (Inc 3.0); Finalize TacMobile design and implementation of metadata tagging and content management to align with Family of Systems Community of Interest data management model schema - (Inc 3.0); Continue maturing requirements development for Multistatic Active Coherent (MAC) Enhancements (MAC-E). Commence design and development of EDM upgrade for MAC-E integration. Integrate enhanced TacMobile data analysis tools and applications to support P-8A MAC-E interoperability - (Inc 3.0); Complete TacMobile Increment 3.0 Data Strategy and Information Support Plan to support Navy TCPED and Net-Centric strategies as well as to support P-8A Poseidon Inc 3, MQ-4C Triton Multi-INT, and Advanced Airborne Sensor (AAS) operations - (Inc 3.0); Finalize integration of Navy enterprise solutions for network services and Common Operational Picture (COP) management (in synch with Distributed Common Ground System Navy (DCGS-N), Undersea Warfare-Decision Support System (USW-DSS)) - (Inc 3.0); Finalize s/w development for sortie management and data services to interface with P-8A media build - (Inc 3.0); Conduct developmental testing to evaluate design and P-8A interfaces interoperability - (Inc 3.0); Conduct testing to achieve system Cybersecurity certifications and accreditations - (Inc 3.0).<br><br>SYSTEM UPGRADES: Implement fleet and engineering change requests into Inc 3 design - (Inc 3.0); Implement hardware upgrades to address obsolescence and technological changes that do not impact system capability, - (Inc 3.0).<br><br>MODERNIZATION: Implement Size Weight Power and Cooling (SWaP-C) reductions into final EDM design and proposed TOC/MTOC design - Inc 3.0). | | | | | |
| ***FY 2020 Base Plans:***<br>INTEROPERABILITY: Update Engineering Development Model (EDM) design to include any changes to appropriate interfaces for P-8A - (Inc 3.0); Update design for Multiple Security Level enclaves and joint system security architecture for P-8A interoperability - (Inc 3.0); Update EDM architecture to support Navy Tasking, Collection, Processing, Exploitation, and Dissemination CONOPS and data reach-back requirements for integrating the wide range of P-8A missions and Anti-Submarine Warfare and Intelligence Surveillance and Reconnaissance data elements with the Maritime Intelligence Surveillance and Reconnaissance Environment - (Inc 3.0); Update EDM design and data strategy to maximize automation, Services Oriented Architecture (SOA), and virtualization for increased interoperability and efficiency - (Inc 3.0); Update TacMobile design and implementation of metadata tagging and content management to align with Family of Systems Community of Interest data management model schema - (Inc 3.0); Continue maturing requirements development for Multistatic Active Coherent (MAC) Enhancements (MAC-E). Commence design and development of EDM | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| upgrade for MAC-E integration. Integrate enhanced TacMobile data analysis tools and applications to support P-8A MAC-E interoperability - (Inc 3.0); Complete TacMobile Increment 3.0 Data Strategy and Information Support Plan to support Navy TCPED and Net-Centric strategies as well as to support P-8A Poseidon Inc 3, MQ-4C Triton Multi-INT, and Advanced Airborne Sensor (AAS) operations - (Inc 3.0); Update integration of Navy enterprise solutions for network services and Common Operational Picture (COP) management (in synch with Distributed Common Ground System Navy (DCGS-N), Undersea Warfare-Decision Support System (USW-DSS)) - (Inc 3.0); Update software development for sortie management and data services to interface with P-8A media build - (Inc 3.0); Conduct system integration and developmental testing to evaluate design and P-8A interfaces interoperability - (Inc 3.0); Conduct testing to achieve system Cybersecurity certifications and accreditations - (Inc 3.0).<br><br>SYSTEM UPGRADES: Implement fleet and engineering change requests into Inc 3 design - (Inc 3.0); Implement hardware upgrades to address obsolescence and technological changes that do not impact system capability, investigate emerging technologies through study, development, and associated testing for feasibility of program insertion - (Inc 3.0).<br><br>MODERNIZATION: Implement Size Weight Power and Cooling (SWaP-C) reductions into final EDM design and proposed TOC/MTOC design - Inc 3.0).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding increase for TacMobile Increment 3.0 development is due in transition from Systems Design to Systems Engineering Development, Updating Engineering Development Model (EDM) development, and commencing system integration and testing | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.780 | 4.645 | 6.092 | 0.000 | 6.092 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2906: *TacMobile* | 37.145 | 39.344 | 30.366 | - | 30.366 | 26.937 | 27.508 | 28.042 | 28.602 | Continuing | Continuing |

**Remarks**

Maritime Patrol & Reconnaissance Force (MPRF) Mission Support Systems

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

**D. Acquisition Strategy**

Evolutionary Acquisition - Increment 2.0 provided enhanced Beyond Line of Sight (BLOS) Global Information Grid (GIG) reach back capability, and supports Maritime Situational Awareness connectivity enhancements for data exchange with Maritime Patrol and Reconnaissance Force (MPRF) aircraft and with Coalition data networks. It incorporated Anti-Submarine Warfare (ASW) acoustical analysis improvements and new P-3C aircraft ASW interfaces. Increment 2.1 supported migration to follow on Global Command and Control System - Maritime (GCCS-M) version 4.0.3 and introduction of the P-8A Poseidon. Tech Refresh 2.1.1 supports technical engineering changes associated with the introduction of P-8A Poseidon Increment 2, MQ-4C Triton, Advanced Airborne Sensor (AAS), migration to GCCS-M 4.1 Group Level, and transition to WIN10 baselines. Increment 3 will incorporate support for other Maritime Patrol and Reconnaissance Force (MPRF) Family of Systems (FOS) Aircraft Systems, as they transition to a Services Oriented Architecture (SOA).

**E. Performance Metrics**

The primary metrics utilized by the TacMobile program development process include achieving/maintaining all required Interface Exchange Requirements (IER's) and successful achievement of 100% of Key Performance Parameters for incremental upgrade threshold capabilities, as observed by Commander Operational Test Force representatives during Operational Evaluation. TacMobile Inc 2.1 development supported increased IER requirements of 486% from 112 to 544. Development to support these new IER's tapered off in FY-12 as the Increment entered the Operational Evaluation Phase. Development focus then shifted to efforts required to retain fielded IER's and update IER's to comply with emerging and evolving standards associated with P-8A Poseidon Increment 2, and the MQ-4C Triton Unmanned Aerial System (UAS), other Maritime Patrol and Reconnaissance Force (MPRF) Family of Systems (FOS) Aircraft and Systems, and evolving operational employment concepts. Increment 3 development will increase IER's by extending the TacMobile core to extend integrated capabilities into Higher Than SECRET enclaves and Services Oriented Architecture (SOA). The quantification of the increase in IER's will be dependent upon final requirements which are still being defined.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>0486 / *Tactical Support Center* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | C/CPFF | SSC LANT; TAPESTRY; CENTURUM : Charleston; SC; Pax River, MD | 11.645 | 1.485 | Dec 2017 | 1.457 | Dec 2018 | 1.802 | Dec 2019 | - | | 1.802 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | SSC LANT; TAPESTRY; CENTURM, BAH, Sentek : Charleston, SC; Pax River, MD; San Diego, CA | 34.694 | 1.438 | Dec 2017 | 1.378 | Dec 2018 | 1.747 | Dec 2019 | - | | 1.747 | Continuing | Continuing | Continuing |
| Training Development | C/CPFF | SSC LANT; TAPESTRY; CENTURUM, Sentek : Charleston, SC; Pax River, MD; San Diego, CA | 3.461 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development | C/CPFF | SSC LANT, TAPESTRY, CENTURUM, BAH, Sentek : Charleston, SC; Pax River, MD; San Diego, CA | 48.508 | 0.800 | Dec 2017 | 0.700 | Dec 2018 | 1.066 | Dec 2019 | - | | 1.066 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | C/CPFF | SSC LANT, TAPESTRY; CENTURUM : Charleston, SC; Pax River, MD | 1.925 | 0.035 | Dec 2017 | 0.035 | Dec 2018 | 0.035 | Dec 2019 | - | | 0.035 | Continuing | Continuing | Continuing |
| Configuration Management | C/CPFF | SSC LANT, TAPESTRY; CENTURUM : Charleston, SC; Pax River, MD | 1.500 | 0.046 | Dec 2017 | 0.023 | Dec 2018 | 0.023 | Dec 2019 | - | | 0.023 | Continuing | Continuing | Continuing |
| Technical Data | C/CPFF | SSC LANT, TAPESTRY; CENTURUM : | 1.920 | 0.251 | Dec 2017 | 0.251 | Dec 2018 | 0.251 | Dec 2019 | - | | 0.251 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>0486 / *Tactical Support Center* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Charleston, SC; Pax River, MD | | | | | | | | | | | | | |
| Studies & Analyses | C/CPFF | SSC LANT, TAPESTRY, CENTURUM, Sentek : Pax River, MD; San Diego CA | 1.125 | 0.015 | Dec 2017 | 0.015 | Dec 2018 | 0.015 | Dec 2019 | - | | 0.015 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 104.778 | 4.070 | | 3.859 | | 4.939 | | - | | 4.939 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | C/CPIF | SSC LANT; TAPESTRY; CENTURUM : Charleston, SC; Pax River, MD | 3.456 | 0.336 | Dec 2017 | 0.436 | Dec 2018 | 0.803 | Dec 2019 | - | | 0.803 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | MIPR | OPTEVFOR; SSC LANT; TAPESTRY; CENTURUM : Jacksonville, FL | 6.177 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 9.633 | 0.336 | | 0.436 | | 0.803 | | - | | 0.803 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | C/CPIF | TAPESTRY; CENTURUM; BAH; Sentek : Pax River, MD; Charleston, SC; San Diego, CA | 3.420 | 0.195 | Dec 2017 | 0.195 | Dec 2018 | 0.195 | Dec 2019 | - | | 0.195 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>0486 / *Tactical Support Center* | |

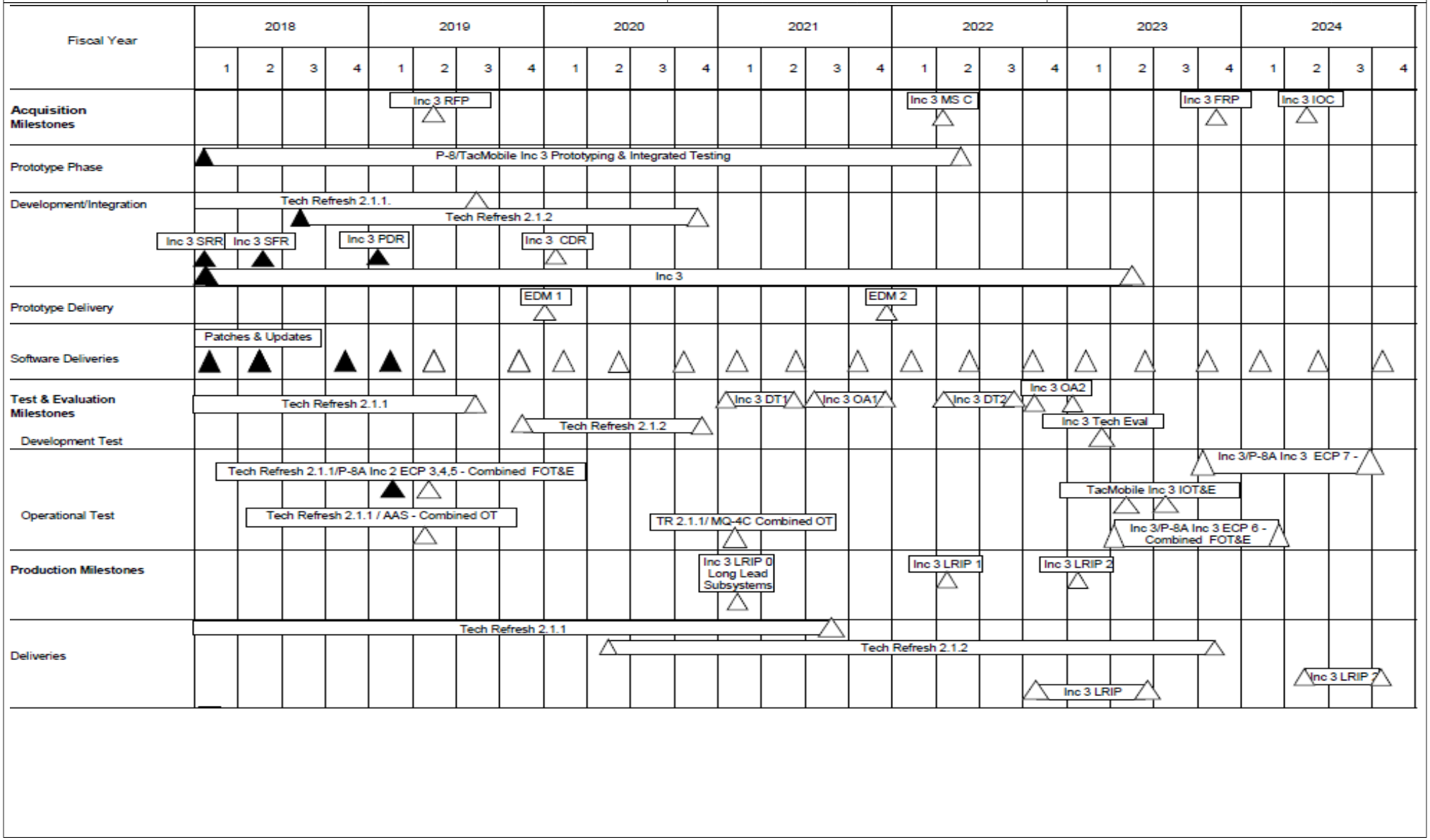
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | SSC LANT : Charleston, SC | 2.327 | 0.107 | Dec 2017 | 0.107 | Dec 2018 | 0.107 | Dec 2019 | - | | 0.107 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPIF | SSC LANT; PMW 750; BAH; TAPESTRY; CENTURUM; Sentek : Charleston, SC; San Diego, CA | 14.190 | 0.047 | Dec 2017 | 0.023 | Dec 2018 | 0.023 | Dec 2019 | - | | 0.023 | Continuing | Continuing | Continuing |
| Travel | WR | PMW750 : San Diego, CA | 0.282 | 0.025 | Dec 2017 | 0.025 | Dec 2018 | 0.025 | Dec 2019 | - | | 0.025 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 20.219 | 0.374 | | 0.350 | | 0.350 | | - | | 0.350 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 134.630 | 4.780 | | 4.645 | | 6.092 | | - | | 6.092 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0486*** | | | | |
| Software Delivery (Quarterly) | 1 | 2018 | 4 | 2024 |
| Tech Refresh Delivery (TR 2.1.1) | 1 | 2018 | 3 | 2021 |
| Tech Refresh Delivery (TR 2.1.2) | 2 | 2020 | 4 | 2023 |
| Combined Operational Test (Tech Refresh 2.1.1) | 2 | 2019 | 1 | 2021 |
| Development (TR 2.1.1) | 1 | 2018 | 3 | 2019 |
| Development (TR 2.1.2) | 3 | 2018 | 4 | 2020 |
| Developmental Test (Tech Refresh 2.1.1) | 1 | 2018 | 3 | 2019 |
| Developmental Test (Tech Refresh 2.1.2) | 4 | 2019 | 4 | 2020 |
| Prototyping & Integrated Testing (P-8/TacMobile) (Increment 3) | 1 | 2018 | 2 | 2022 |
| System Requirements Review (Increment 3) | 1 | 2018 | 1 | 2018 |
| System Functional Review (Increment 3) | 2 | 2018 | 2 | 2018 |
| Request for Proposal release (Increment 3) | 2 | 2019 | 2 | 2019 |
| Preliminary Design Review (Increment 3) | 1 | 2019 | 1 | 2019 |
| Critical Design Review (Increment 3) | 1 | 2020 | 1 | 2020 |
| Development (Increment 3) | 1 | 2018 | 2 | 2023 |
| Developmental Test (Increment 3) | 1 | 2021 | 3 | 2022 |
| Operational Assessment (Increment 3) | 3 | 2021 | 1 | 2023 |
| Full Rate Production (Increment 3) | 4 | 2023 | 4 | 2023 |
| Milestone C (Increment 3) | 2 | 2022 | 2 | 2022 |
| Low Rate Initial Production (Increment 3) | 1 | 2021 | 1 | 2021 |
| Low Rate Initial Production (Increment 3) 1 | 2 | 2022 | 2 | 2022 |
| Low Rate Initial Production (Increment 3) 2 | 1 | 2023 | 1 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>0486 / *Tactical Support Center* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Developmental Test (Increment 3 Tech Eval) | 1 | 2023 | 1 | 2023 |
| Operational Test (Increment 3) | 2 | 2023 | 3 | 2023 |
| Increment 3 EDM Delivery | 1 | 2020 | 4 | 2021 |
| Increment 3 LRIP Delivery | 4 | 2022 | 4 | 2024 |
| Combined Operational Tests/Follow On Tests (Increment 3) | 2 | 2023 | 1 | 2024 |
| Increment 3 IOC | 2 | 2024 | 2 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2343: *Tactical METOC Applications* | 0.000 | 0.000 | 0.000 | 12.198 | - | 12.198 | 12.052 | 12.644 | 13.913 | 14.196 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604231N from PE 0604218N Project 2343 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The Tactical Meteorology and Oceanography (METOC) Applications Project provides cyber secure operational effects decision aid capabilities for Navy and Marine Corps warfighters in the context of Joint Operations in a net-centric environment. This project funds the agile software development of the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program of record. NITES-Next program identifies and transitions state-of-the-art decision support software technologies from the government and commercial industry's technology base, and then demonstrates and validates these capabilities before fielding. These software decision support tools provide platform, sensor, communications, and weapon systems performance assessments for warfighters in terms of their littoral and deep-strike battlespace environments. These assessments allow mission planners and warfighters, from Unit to Theater level, to optimize their sensor employment on airborne, surface, and subsurface platforms in support of Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare (MIW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), Expeditionary Warfare (EXW), Electronic Warfare (EW), Information Operations (IO), Intelligence Operations (INT), Non-Combat Operations (NCO), Command, Control, Communication (CCC), and Naval Special Warfare (NSW). Performance assessments leading to improvements in operational and tactical control are conducted through a two-tiered approach: 1) Meteorological and Oceanographic (METOC) Decision Aids and, 2) Operational Effects Decision Aids (OEDAs). METOC Decision Aides consist of a series of analysis tools which characterize the physical environment conditions of the battlespace based on the best set of physical environment data available at the time (i.e., some combination of historical and/or real-time (or near real-time) in-situ, and numerically modeled forecast data). OEDAs use the METOC Decision Aide information by fusing it with relevant, often-classified, sensor and target data to predict how weapons and sensor systems will perform. Performance results are displayed in tabular and graphic formats integrated into net-centric visualization tools for use by mission planners, and combat/weapon system operators to develop localization plans, USW/AAW/ASUW screens, STW profiles, and AMW ingress and egress points. METOC Decision Aides and OEDAs use data obtained through direct interfaces to Navy combat systems. Cyber secure capabilities are a current emphasis required to characterize and/or predict sensor and weapons system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses multi-warfare areas, particularly shallow water ASW, NSW, and missile and air defense/strike capabilities.

Funding supports development and integration efforts for Meteorological and Oceanographic (METOC) systems to generate and collect METOC data and fuse multiple intelligence inputs to more robustly characterize and predict tactical atmospheric and oceanographic conditions. This integrated METOC picture will support real-time battlespace awareness of propagation conditions affecting signals across the electromagnetic spectrum. METOC data will be fused with other intelligence data and automatically provided to shipboard combat systems to inform kinetic and non-kinetic fires.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

Fiscal Year (FY) 2020 request provides for NITES-Next to conduct an Fleet Capability Release (FCR)-3 Field Technical Review (FTR) and seek to obtain an FCR-3 Fielding Decision (FD) to deliver the mobile variant and Electromagnetic (EM) Prediction capabilities. The program will also conduct an FCR-4 Build Technical Review (BTR) and seek to obtain an FCR-4 Build Decision (BD) from the Milestone Decision Authority (MDA). NITES-Next will begin initial software development of the FCR-4 capability, pending Requirements Governance Board (RGB) approval. The program will begin planning for the FCR-5 development and contracting activities (including initiating the update of all required documentation, Requirements Development Package (RDP), Cost Analysis Requirements Document (CARD), Program Life Cycle Cost Estimate (PLCCE) and Acquisition Program Baseline (APB). NITES-Next will plan for and conduct System Integration Test's (SITs) and Developmental Test& Evaluation (DT&E) for FCR-3. The program will update its Risk Management Framework (RMF) Authority to Operate (ATO) for FCR-3 software.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Naval Integrated Tactical Environmental System Next Generation (NITES-Next) | 0.000 | 0.000 | 12.198 | 0.000 | 12.198 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604218N, Project 2343 | | | | | |
| ***FY 2020 Base Plans:***<br>NITES-Next will conduct an FCR-3 FTR and seek to obtain an FCR-3 FD to deliver the mobile variant and Electromagnetic (EM) Prediction capabilities. The program will also conduct an FCR-4 BTR and seek to obtain an FCR-4 BD from the MDA. NITES-Next will begin initial software development of the FCR 4 capability, pending RGB approval. The program will begin planning for the FCR-5 development and contracting activities (including initiating the update of all required documentation, Requirements Development Package (RDP), and Acquisition Program Baseline (APB). The program will update its Risk Management Framework (RMF) Authority to Operate (ATO) for Fleet Capability Release FCR-3 software. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0604218N, Project 2343 was $9.268M. Funding increases by $2.93M to $12.198M in FY20. Funding increase is attributed to DT&E of FCR-3, RMF update and the development of FCR-5. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 12.198 | 0.000 | 12.198 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4226: *Meteorological Equipment* | 21.000 | 21.072 | 14.687 | - | 14.687 | 14.876 | 13.366 | 13.814 | 13.357 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0604218N/2343: *Tactical METOC Applications* | 0.000 | 9.268 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.268 |
| • RDTE/0603207N/2343: *Tactical METOC Applications* | 11.448 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 175.172 |

**Remarks**

**D. Acquisition Strategy**

The NITES-Next program acquisition, management and contracting strategies are to support the Tactical Meteorology & Oceanography (METOC) Applications project to continue the development of state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessment capabilities for open ocean and littoral operating environments. The Department of the Navy (DoN) maintains management oversight of the NITES-Next program's acquisition and contracting strategies. The Department of the Navy (DoN) requirements for the NITES-Next program's acquisition and contracting strategies are based on approved Joint Capabilities Integration and Development System (JCIDS) documentation.

**E. Performance Metrics**

Goal: Field software decision aid capabilities for Navy and Marine Corps war fighters in order to facilitate the characterization and prediction of the physical environment in the battlespace.

Metric: Meet the performance metrics identified in approved Naval Integrated Tactical Environmental Next Generation (NITES-Next) Program's requirements documents (e.g., Concept Definition Document (CDD) and individual Requirements Definition Packages (RDPs).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>2343 / *Tactical METOC Applications* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NITES-Next | WR | SSC Pacific : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 2.761 | Nov 2019 | - | | 2.761 | Continuing | Continuing | Continuing |
| NITES-Next | C/FP | SAIC : Virginia | 0.000 | 0.000 | | 0.000 | | 2.252 | Dec 2019 | - | | 2.252 | Continuing | Continuing | Continuing |
| NITES-Next | WR | SSC Atlantic : South Carolina | 0.000 | 0.000 | | 0.000 | | 0.094 | Oct 2019 | - | | 0.094 | Continuing | Continuing | Continuing |
| NITES-Next/Engineering | C/IDIQ | Various : Various | 0.000 | 0.000 | | 0.000 | | 4.759 | May 2020 | - | | 4.759 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 9.866 | | - | | 9.866 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NITES-Next | C/FP | SAIC : Virginia | 0.000 | 0.000 | | 0.000 | | 1.353 | Dec 2019 | - | | 1.353 | 0.000 | 1.353 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.353 | | - | | 1.353 | 0.000 | 1.353 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NITES-Next | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.398 | Nov 2019 | - | | 0.398 | 0.000 | 0.398 | - |
| NITES-Next | C/FP | BAH : San Diego CA | 0.000 | 0.000 | | 0.000 | | 0.581 | Dec 2019 | - | | 0.581 | 0.000 | 0.581 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.979 | | - | | 0.979 | 0.000 | 0.979 | N/A |

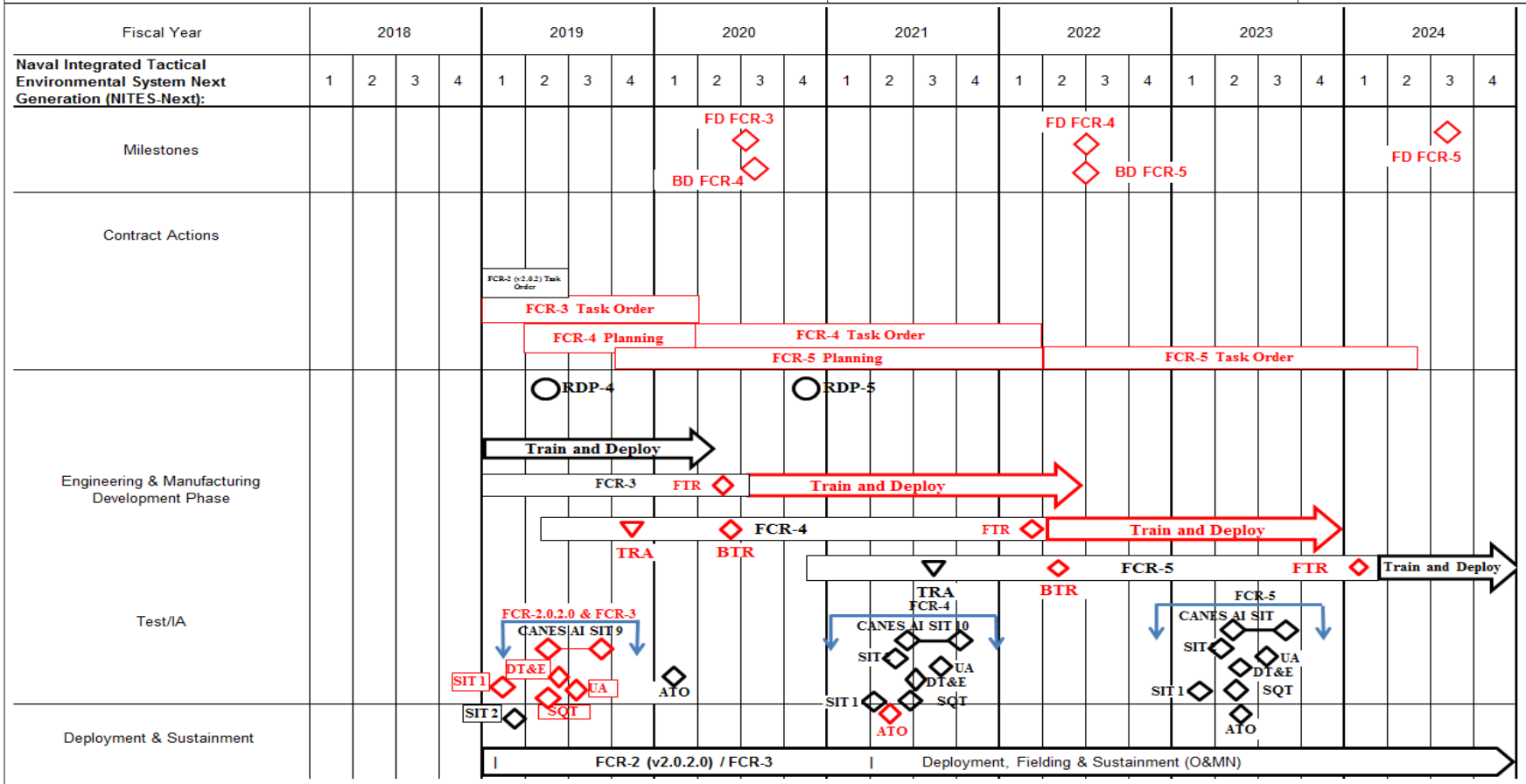
| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 12.198 | | - | | 12.198 | Continuing | Continuing | N/A |

**Remarks**

FY18 cost data is provided under PE 0603207N, Project 2343.

FY19 cost data is provided under PE 0604218N, Project 2343.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |




**NOTE: FY19 funding was provided under PE 0604218N Project 2343**

**Acronyms:** OTRR = Opertional Test Readiness Review. RDP = Requirements Definition Package. FCR = Fleet Capability Release. TRA = Technology Readiness Assessment. BD = Build Decision. FD = Fielding Decision. Limited Fielding Decision = LFD. IOC= Initial Operational Capability. IATO = Interim Authority to Operate. ATO = Authority to Operate. UA = User Assessment. BTR = Build Technical Review. Field Technical Reivew = FTR. SIT = System Integration Test. RALOT = Risk Assessment Level of Testing. DT&E = Developmental Test & Evaluation. ADM - Acquisition Decision Memorandum. SOVT = System Verification Operational Test. CANES = Consolidated Afloat Networks and Enterprise Services. AI = Application Integration.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Naval Integrated Tactical Environmental System Next Generation (NITES-Next)*** | | | | |
| Milestones: Build Decision (BD) Fleet Capability Release - 4 | 3 | 2020 | 3 | 2020 |
| Milestones: Fielding Decision (FD) Fleet Capability Release - 3 | 3 | 2020 | 3 | 2020 |
| Milestones: Fielding Decision (FD) Fleet Capability Release - 4 | 2 | 2022 | 2 | 2022 |
| Milestones: Building Decision (BD) Fleet Capability Release - 5 | 3 | 2022 | 3 | 2022 |
| Milestones: Fielding Decision (FD) Fleet Capability Release - 5 | 3 | 2024 | 3 | 2024 |
| Contract Actions: FCR-3 Task Order | 1 | 2020 | 2 | 2020 |
| Contract Actions: FCR-4 Task Order | 2 | 2020 | 1 | 2022 |
| Contract Actions: FCR-4 Planning | 1 | 2020 | 1 | 2020 |
| Contract Actions: FCR-5 Planning | 2 | 2020 | 2 | 2022 |
| Contract Actions: FCR-5 Task Order | 2 | 2022 | 2 | 2024 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 2 / Train Deploy | 1 | 2020 | 2 | 2020 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 3 / Train Deploy | 3 | 2020 | 2 | 2022 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 4 / Train and Deploy | 2 | 2022 | 4 | 2023 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 3 | 1 | 2020 | 2 | 2020 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 4 | 1 | 2020 | 2 | 2022 |
| Engineering & Manufacturing Development Phase: Fleet Capability Release - 5 | 4 | 2020 | 1 | 2024 |
| Engineering & Manufacturing Development Phase: Requirements Definition Package - 5 | 4 | 2020 | 4 | 2020 |
| Engineering & Manufacturing Development Phase: Build Technical Review FCR-4 | 2 | 2020 | 2 | 2020 |
| Engineering & Manufacturing Development Phase: Build Technical Review FCR-5 | 2 | 2022 | 2 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2343 / *Tactical METOC Applications* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Engineering & Manufacturing Development Phase: Technology Readiness Assessment - 5 | 3 | 2021 | 3 | 2021 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-3 | 2 | 2020 | 2 | 2020 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-4 | 1 | 2022 | 1 | 2022 |
| Engineering & Manufacturing Development Phase: Field Technical Review FCR-5 | 1 | 2024 | 1 | 2024 |
| Test/IA: Fleet Capability Release V 2.0.2.0 | 1 | 2019 | 4 | 2019 |
| Test/IA: Fleet Capability Release - 3 | 1 | 2019 | 4 | 2019 |
| Test/IA: Fleet Capability Release - 4 | 1 | 2021 | 4 | 2021 |
| Test/IA: Fleet Capability Release - 5 | 4 | 2022 | 4 | 2023 |
| Test/IA: System Integration Test - 1 (FCR-4) | 2 | 2021 | 2 | 2021 |
| Test/IA: System Integration Test - 2 (FCR-4) | 2 | 2021 | 2 | 2021 |
| Test/IA: System Integration Test - 1 (FCR-5) | 1 | 2023 | 1 | 2023 |
| Test/IA: System Integration Test - 2 (FCR-5) | 2 | 2023 | 2 | 2023 |
| Test/IA: Authority to Operate FCR-3 | 1 | 2020 | 1 | 2020 |
| Test/IA: Authority to Operate FCR-4 | 2 | 2021 | 2 | 2021 |
| Test/IA: Authority to Operate FCR-5 | 2 | 2023 | 2 | 2023 |
| Test/IA: System Qualification Test FCR-4 | 2 | 2021 | 2 | 2021 |
| Test/IA: System Qualification Test FCR-5 | 2 | 2023 | 2 | 2023 |
| Test/IA: Developmental Test Fleet Capability Release - FCR 3 | 2 | 2019 | 2 | 2019 |
| Test/IA: Developmental Test Fleet Capability Release - FCR-4 | 3 | 2021 | 3 | 2021 |
| Test/IA: Developmental Test Fleet Capability Release - FCR-5 | 2 | 2023 | 2 | 2023 |
| Test/IA: User Assessment FCR-4 | 3 | 2021 | 3 | 2021 |
| Test/IA: User Assessment FCR-5 | 3 | 2023 | 3 | 2023 |
| Test/IA: CANES AI SIT FCR-4 | 2 | 2021 | 4 | 2021 |
| Test/IA: CANES AI SIT FCR-5 | 2 | 2023 | 3 | 2023 |
| Test/IA: Deployment and Sustainment: Deployment, fielding and Sustainment (OMN) | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | | | | Project (Number/Name)<br>2345 / *Fleet METOC Equipment* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2345: *Fleet METOC Equipment* | 0.000 | 0.000 | 0.000 | 0.220 | - | 0.220 | 0.620 | 0.577 | 0.487 | 0.496 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604231N from PE 0604218N Project 2345 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

This project provides for the engineering and manufacturing development of sensors, communication interfaces, processing and display meteorological and oceanographic (METOC) equipment. This equipment is designed to provide future mission capabilities for war fighters to measure, ingest, store, process, distribute and display METOC parameters and derived products.

This project also exploits new government off-the-shelf/commercial off-the-shelf technologies, tactical sensors and web enablement for the Navy's computer-based tactical shipboard and shore capability used to predict and assess the operational effects of the physical environment on the performance of platforms, weapons and sensor systems. This project includes development of warfare specific mission planning modules to support unmanned systems with integration of data from environmental and tactical sensor systems, model forecast information and Geospatial Information & Services Databases. This project also supports development of autonomous environmental sensing systems for situational awareness and tactical decision aid/mission planner support, as well as iridium and advanced satellite communication integration in METOC sensor, vehicle control and mission planning systems that will be required to achieve Chief of Naval Operation objectives for information dominance and decision superiority.

Major emphasis areas include the Meteorological and Oceanographic Future Mission Capabilities (METOC FMC) project, Littoral Battlespace Sensors - Unmanned Undersea Vehicles (LBS-UUV) and the Environmental Satellite Receiver Processor (ESRP) program (comprised of AN/SMQ-11 (sea and shore configuration) and AN/FMQ-17 (shore configuration) systems).

Fiscal Year (FY) 20 request provides for the Littoral Battlespace Sensors - Gliders (LBS-G) and Littoral Battlespace Sensors - Autonomous Undersea Vehicles (LBS-AUV) engineering design studies. Develop system upgrades via Engineering Change Proposals (ECP's) and correct any identified software and/or hardware deficiencies. Continue investigating next generation propulsion technologies such as Hybrid Thruster, battery chemistry, thermal engines, and universal buoyancy engines for potential system upgrades. Also, investigating battery technology, bio-fouling solutions, afterbody solutions, and open architecture approaches.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** Littoral Battlespace Sensors - Unmanned Undersea Vehicle (LBS-UUV) | 0.000 | 0.000 | 0.072 | 0.000 | 0.072 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604218N , Project 2345<br>***FY 2020 Base Plans:***<br>Continue to conduct Littoral Battlespace Sensing-Gliders (LBS-G) and Littoral Battlespace Sensing-Autonomous Unmanned Vehicle (LBS-AUV) engineering design studies. Continue developing system upgrades via Engineering Change Proposals (ECP's) and correct any identified software and/or hardware deficiencies. Continue investigating next generation propulsion technologies such as Hybrid Thruster and universal buoyancy engines for potential system upgrades. Also, investigate new battery technologies, bio-fouling solutions, afterbody solutions, and open architecture approaches.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0604218N Project 2345 was $0.358M for LBS-UUV. Funding decreased by $0.286M to $0.072M in FY20. Funding decrease is attributed to the availability of prior year balances. | | | | | |
| ***Title:*** Environmental Satellite Receiver Processor (ESRP) | 0.000 | 0.000 | 0.148 | 0.000 | 0.148 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604218N, Project 2345.<br>***FY 2020 Base Plans:***<br>Continue to develop and test annual hardware and software upgrades to integrate new meteorological and oceanographic (METOC) Satellite Sensors available in the Geostationary Operational Environmental Satellites (GOES) and the Polar Orbiting Environmental Satellites (POES). Continue integration of Environmental Satellite Receiver Processor (ESRP) systems in support of Weather Satellite Follow-On (WSF-M), Operational Response Space (ORS)-8, GOES-16, GOES-17 and Europe Meteorology Satellites (EUMETSAT) satellites. Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| In FY19 funding under PE 0604218N, Project 2345 was $0.314M. Funding decreases by $0.166M to $0.148M in FY20. Funding decrease from FY19 to FY20 was to account for availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 0.220 | 0.000 | 0.220 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4226: *Meteorological Equipment* | 21.000 | 21.072 | 14.687 | - | 14.687 | 14.876 | 13.366 | 13.814 | 13.357 | Continuing | Continuing |
| • RDTEN/0604218N/2345: *Fleet METOC Equipment* | 0.755 | 0.672 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 66.036 |

**Remarks**

**D. Acquisition Strategy**

Acquisition, management and contracting strategies are to support engineering and manufacturing development by providing funds to Hydroid, Teledyne Brown and Naval Research Laboratory.

**E. Performance Metrics**

Goal: Develop and engineer equipment to acquire Meteorological and Oceanographic (METOC) data in order to improve the accuracy of global and regional scale METOC forecast models.

Metric: Tasks will address no less than 75% of applicable capability gaps and requirements, as identified by Resource and Requirements Sponsor(s). As tasks relate to exploitation of fleet sensors for METOC data (Through-the-Sensor), no less than 80% of approved initiatives will maintain cost, schedule, performance and transition risk analysis certification that will have been completed within the past 12 months.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>2345 / *Fleet METOC Equipment* | |

**Product Development ($ in Millions)**

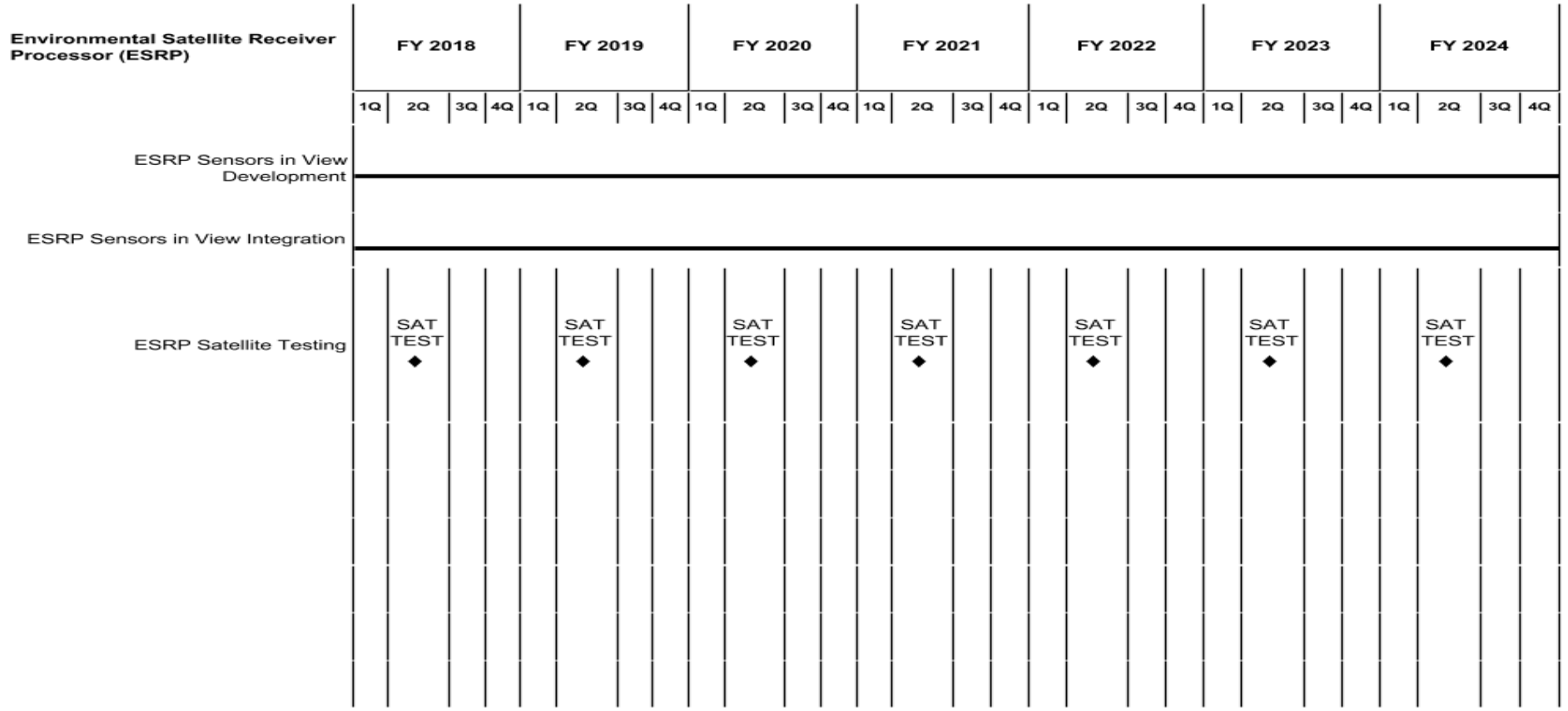
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| METOC ESRP | SS/CPFF | RAYTHEON : Indianapolis | 0.000 | 0.000 | | 0.000 | | 0.148 | Feb 2020 | - | | 0.148 | Continuing | Continuing | Continuing |
| Littoral Battlespace Sensing - Gliders | C/CPIF | Teledyne Brown Engineering : Alabama | 0.000 | 0.000 | | 0.000 | | 0.035 | Mar 2020 | - | | 0.035 | Continuing | Continuing | Continuing |
| Littoral Battlespace Sensing - Autonomous Undersea Vehicle (Submarine)/Razorback | C/FP | Hydroid : Pocasset, MA | 0.000 | 0.000 | | 0.000 | | 0.037 | Mar 2020 | - | | 0.037 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.220 | | - | | 0.220 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 0.220 | | - | | 0.220 | Continuing | Continuing | N/A |

**Remarks**

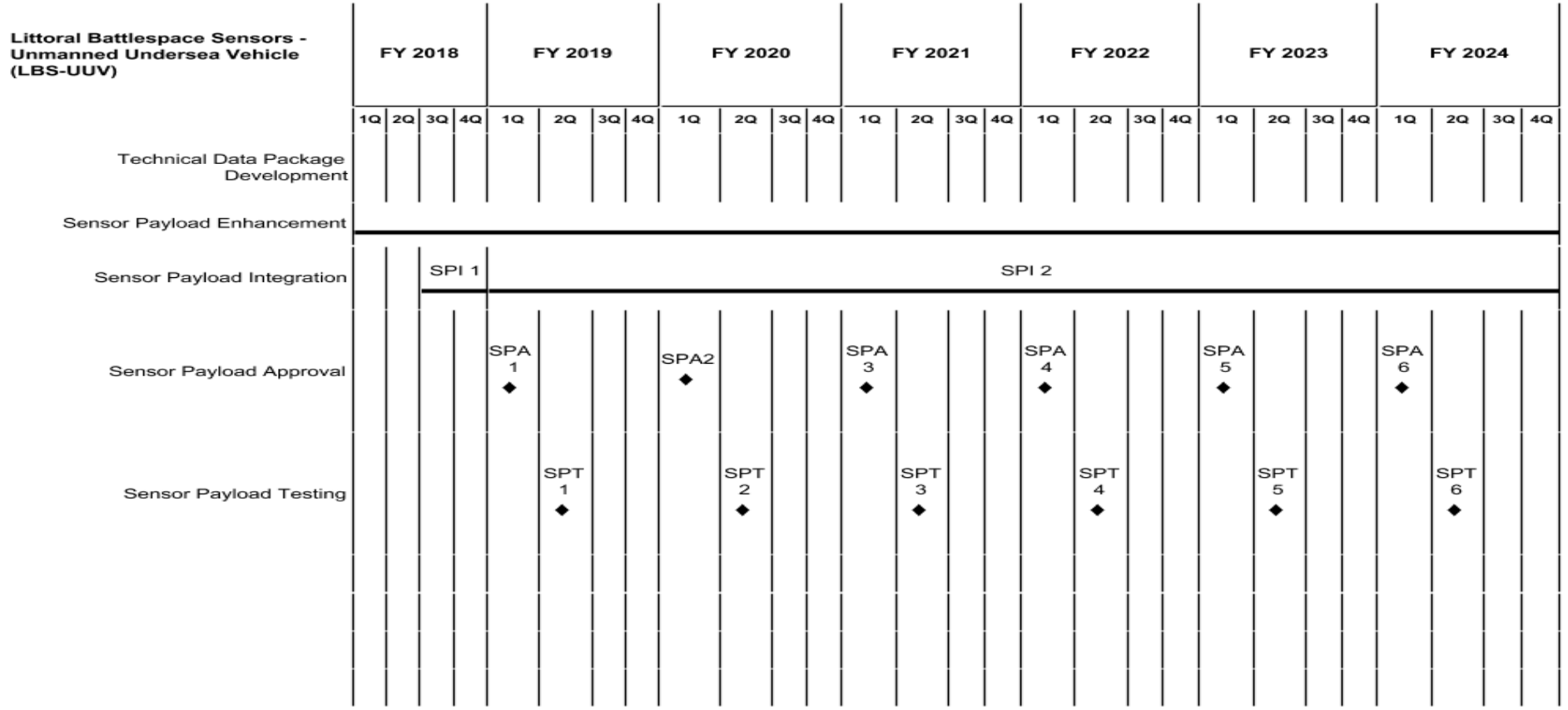
FY18 and FY19 cost data is provided under PE 0604218N Project 2345.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |




*2020PB - 0604231N - 2345 NOTE: FY18 and FY19 funding was provided under PE 0604218N , Project 2345*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |




*2020PB - 0604231N - 2345 NOTE: FY18 and FY19 funding was provided under PE 0604218N , Project 2345*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Environmental Satellite Receiver Processor (ESRP)*** | | | | |
| ESRP Sensors in View Development: ESRP Sensors in View Development | 1 | 2018 | 4 | 2024 |
| ESRP Sensors in View Integration: ESRP Sensors in View Integration | 1 | 2018 | 4 | 2024 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY18) | 2 | 2018 | 2 | 2018 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY19) | 2 | 2019 | 2 | 2019 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY20) | 2 | 2020 | 2 | 2020 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY21) | 2 | 2021 | 2 | 2021 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY22) | 2 | 2022 | 2 | 2022 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY23) | 2 | 2023 | 2 | 2023 |
| ESRP Satellite Testing: ESRP Satellite Testing (FY24) | 2 | 2024 | 2 | 2024 |
| ***Littoral Battlespace Sensors - Unmanned Undersea Vehicle (LBS-UUV)*** | | | | |
| Sensor Payload Enhancement: | 1 | 2018 | 4 | 2024 |
| Sensor Payload Integration: Sensor Payload Integration1 | 3 | 2018 | 4 | 2018 |
| Sensor Payload Integration: Sensor Payload Integration2 | 1 | 2019 | 4 | 2024 |
| Sensor Payload Approval: Sensor Payload Approval 1 | 1 | 2019 | 1 | 2019 |
| Sensor Payload Approval: Sensor Payload Approval 2 | 1 | 2020 | 1 | 2020 |
| Sensor Payload Approval: Sensor Payload Approval 3 | 1 | 2021 | 1 | 2021 |
| Sensor Payload Approval: Sensor Payload Approval 4 | 1 | 2022 | 1 | 2022 |
| Sensor Payload Approval: Sensor Payload Approval 5 | 1 | 2023 | 1 | 2023 |
| Sensor Payload Approval: Sensor Payload Approval 6 | 1 | 2024 | 1 | 2024 |
| Sensor Payload Testing: Sensor Payload Testing 1 | 2 | 2019 | 2 | 2019 |
| Sensor Payload Testing: Sensor Payload Testing 2 | 2 | 2020 | 2 | 2020 |
| Sensor Payload Testing: Sensor Payload Testing 3 | 2 | 2021 | 2 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2345 / *Fleet METOC Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Sensor Payload Testing: Sensor Payload Testing 4 | 2 | 2022 | 2 | 2022 |
| Sensor Payload Testing: Sensor Payload Testing 5 | 2 | 2023 | 2 | 2023 |
| Sensor Payload Testing: Sensor Payload Testing 6 | 2 | 2024 | 2 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2363: *Remote Sensing Capability Development* | 0.000 | 0.000 | 0.000 | 5.651 | - | 5.651 | 7.448 | 4.862 | 4.740 | 4.838 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604231N from PE 0604218N Project 2363 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

RSCD characterizes the ocean environment using a variety of remote sensing techniques that provide that capability to discriminate atypical oceanographic phenomena from the natural environment that will greatly improve undersea dominance capabilities. The Naval Oceanographic Office will employ oceanographic data to refine and extend environmental characterization of the phenomena and disseminate data to the Fleet. Efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion.

Fiscal Year (FY) 2020 request provides for continued target data collection, enhancements on algorithms and continue to integrate algorithms for access over the network. Funding will also support a doubling of the requirements per resource sponsor direction. This requirements increase will cause the program to double the engineering team which will oversee the Test and Evaluation as well as the Validation and Verification of new and existing capabilities. Funds will also be used to begin to establish a cloud based computing environment and data repository.

FY 2020 funds will also develop and deliver algorithms in support of the RSCD project and will support Fleet Anti-Submarine Warfare (ASW) and Mine Warfare (MIW) missions.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Remote Sensing Capability Development | 0.000 | 0.000 | 5.651 | 0.000 | 5.651 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604218N, Project 2363 | | | | | |
| ***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604231N Project 2363 as part of PE Consolidation<br>Continue data collection in various weather and sea states to broaden the range of environmental conditions and reduce uncertainty in environmental prediction. Continue software algorithm performance analysis. Continue | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| software algorithm enhancements to automatically detect oceanographic phenomena. Continue software algorithm enhancements and modifications to support transition to a new architecture. Continue to implement the algorithm performance assessment strategy as well as the test and evaluation plans. Document software algorithm test reports. Continue to integrate algorithms for access over the network. Continue development of training to provide the user community education on using the different tools and applications. Coordinate Task, Collect, Process, Exploit, Disseminate (TCPED) process amongst inter-agencies to support Navy Missions. Based on emerging threats, expand scope of the Seahorse project to include new surface detection algorithms. Continue to develop, enhance, and integrate, surface detection algorithm capabilities, and provide input to Fleet training and CONOPS development. Effort introduces rigor and standardization of target detection capabilities in support of CLUTCHSHOT. The program also begins the updating of the requirements Development Package (RDP) as a result of increased requirements per the Resource Sponsor (RS). The requirements increase causes the program to double the engineering team which will oversee the Test and Evaluation as well as the Validation and Verification of new and existing capabilities. Funds also begins the establishment of a cloud based computing environment and data repository in order to test and evaluate, create performance metrics, and understand computational performance of algorithms and technologies that enhance Maritime Domain Awareness (MDA).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0604218N, Project 2363 was $ 5.642 million. Funding increases by $.009 million to $5.651 million in FY20 allowing for additional cloud based computing environment and data repository in order to test and evaluate, create performance metrics, and understand computational performance of algorithms and technologies that enhance Maritime Domain Awareness (MDA).<br><br>The FY2020 funding request for project 2363 was reduced by $1.248 million to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 5.651 | 0.000 | 5.651 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0604218N/2363: *Remote Sensing Capability Development* | 0.000 | 5.642 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.642 |
| • RDTEN/0603207N/2363: *Remote Sensing Capability Development* | 3.816 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 13.116 |

**Remarks**

RDTEN/0603207N/2363 Funding is only in FY18 and prior year under BSO 39.

**D. Acquisition Strategy**

Remote Sensing Capability Development (RSCD) is being managed as a Program Executive Office (PEO) Project, via a Project Definition Document (PDD) construct for acquisition rigor and oversight.

**E. Performance Metrics**

Available in the Project's Requirements Definition Package (RDP).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | C/FFP | SAIC : Viriginia | 0.000 | 0.000 | | 0.000 | | 0.866 | Feb 2020 | - | | 0.866 | Continuing | Continuing | Continuing |
| Remote Sensing Capability Development Data Collection | WR | NRL : Washington, DC | 0.000 | 0.000 | | 0.000 | | 1.347 | Nov 2019 | - | | 1.347 | Continuing | Continuing | Continuing |
| Remote Sensing Capability Development Data Collection | C/FFP | Cubic : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.385 | Apr 2020 | - | | 1.385 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 3.598 | | - | | 3.598 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.849 | Mar 2020 | - | | 0.849 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.849 | | - | | 0.849 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

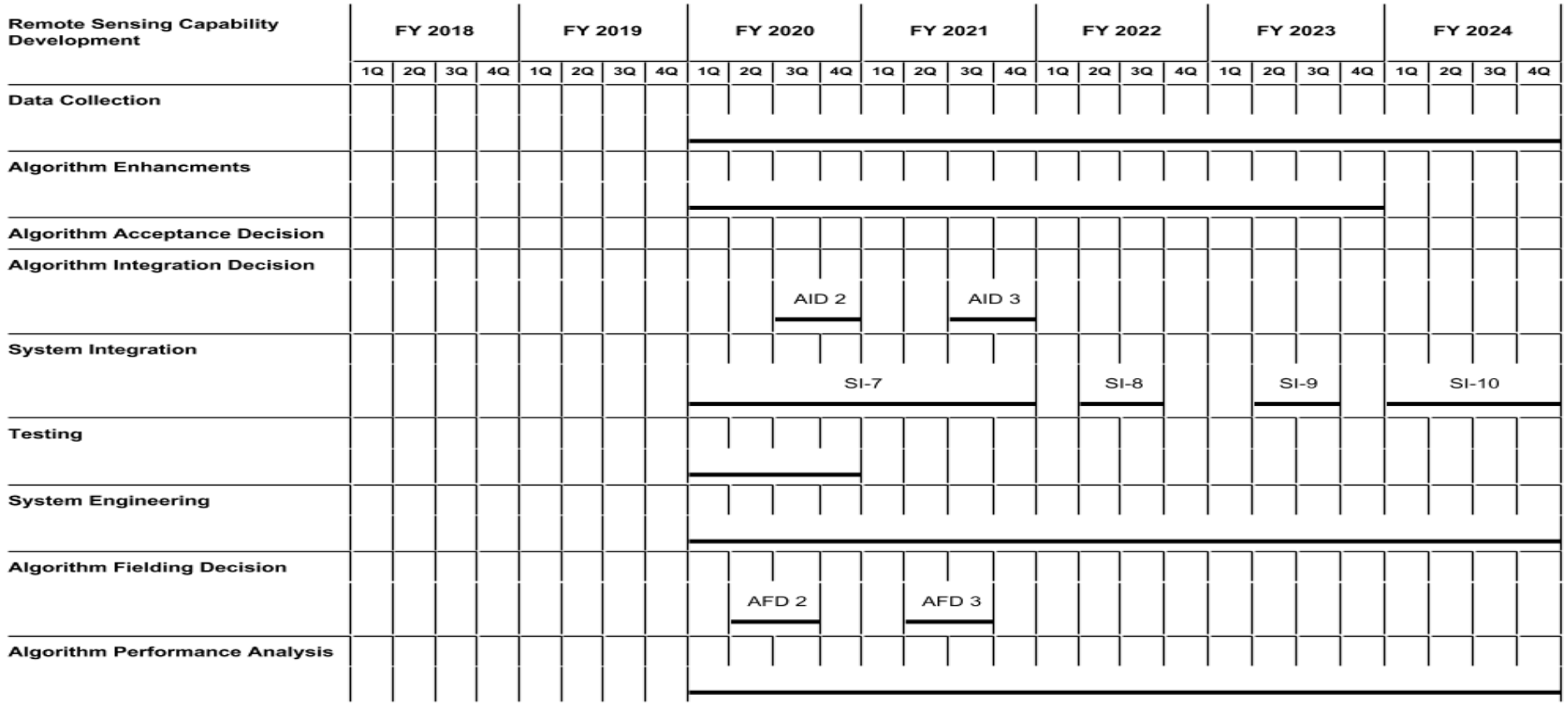
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Remote Sensing Capability Development Data Collection | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.204 | Mar 2020 | - | | 1.204 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.204 | | - | | 1.204 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>2363 / *Remote Sensing Capability Development* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 5.651 | | - | | 5.651 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |




*2020PB - 0604231N - 2363*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>2363 / *Remote Sensing Capability Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Remote Sensing Capability Development*** | | | | |
| Data Collection: | 1 | 2020 | 4 | 2024 |
| Algorithm Enhancments: | 1 | 2020 | 4 | 2023 |
| Algorithm Integration Decision: Algorithm Integration Decision 2 | 3 | 2020 | 4 | 2020 |
| Algorithm Integration Decision: Algorithm Integration Decision 3 | 3 | 2021 | 4 | 2021 |
| System Integration: System Integration 7 | 1 | 2020 | 4 | 2021 |
| System Integration: System Integration 8 | 2 | 2022 | 3 | 2022 |
| System Integration: System Integration 9 | 2 | 2023 | 3 | 2023 |
| System Integration: System Integration 10 | 1 | 2024 | 4 | 2024 |
| Testing: | 1 | 2020 | 4 | 2020 |
| System Engineering: | 1 | 2020 | 4 | 2024 |
| Algorithm Fielding Decision: Algorithm Fielding Decision 2 | 2 | 2020 | 3 | 2020 |
| Algorithm Fielding Decision: Algorithm Fielding Decision 3 | 2 | 2021 | 3 | 2021 |
| Algorithm Performance Analysis: | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | | | | Project (Number/Name)<br>3032 / *NTCSS (Naval Tactical Command Spt Sys)* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3032: *NTCSS (Naval Tactical Command Spt Sys)* | 97.905 | 4.455 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 102.360 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Naval Tactical Command Support System (NTCSS) is a multi-function program designed to provide standard tactical support information systems to various afloat and associated shore-based fleet activities. The mission is to provide the Navy and Marine Corps with an integrated, scalable system that supports the management of logistical information, personnel, material, and funds required to maintain and operate ships, submarines, and aircraft.

Funding provides for the design, development, and testing of NTCSS Open Architecture (OA) development efforts to include: Global Individual Component Repair List (G-ICRL); Beyond Capability of Maintenance Interdiction (BCM-I); Operational Supply (O-Supply), which includes Table of Allowance & Personal Gear Issue (TOA/PGI) and Total Material Visibility & Requisition Management (TMV/RM).

Funding also supports the transition of the current client-server architecture to a service-oriented architecture (SOA) and web-based services (NTCSS OA). This will align with the initiative to bring Navy systems into a common computing environment afloat, interface with Navy Enterprise Resource Planning (ERP) ashore, and provide a more flexible system platform with greater responsiveness to security, information assurance, functional, and system requirements and with greater speed to capability.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** NTCSS (Naval Tactical Command Spt Sys) | 4.455 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Maintenance and Supply Management Capability | | | | | |
| ***FY 2019 Plans:***<br>Acquisition activities continue under project 3620. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.455 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3032 / *NTCSS (Naval Tactical Command Spt Sys)* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2611: *Naval Tactical Command Support System* | 10.570 | 10.991 | 15.154 | - | 15.154 | 15.211 | 16.187 | 17.750 | 18.102 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

NTCSS Open Architecture (OA), Global Individual Component Repair List (G-ICRL) and Beyond Capability of Maintenance Interdiction (BCM-I), and O-Supply serve as the initial steps toward achieving the NTCSS OA "End-State" by introducing web-enabled technology, promoting data sharing with operational fleet forces, and utilization of Navy Data Centers to expose data and move workload ashore. This strategy provides the foundation for NTCSS to migrate to a full service-oriented architecture-based enterprise system.

**E. Performance Metrics**

NTCSS Open Architecture (OA), G-ICRL and BCM-I, eliminate documentation inefficiencies at the Fleet Readiness Centers (FRCs). O-Supply (Table of Allowance & Personal Gear Issue (TOA/PGI) and Total Material Visibility & Requisition Management (TMV/RM) provide centralized and standardized management of PGI and TOA material through the utilization of Navy Data Centers. O-Supply prevents millions of dollars in operational forces obligation losses through improved requisition management. SOA lowers system maintenance costs when compared to maintaining the current, client-server architecture.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3032 / *NTCSS (Naval Tactical Command Spt Sys)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | SSC : North Charleston, SC | 0.668 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.668 | 0.668 |
| Systems Engineering | C/CPFF | SeaPort : San Diego, CA | 3.748 | 0.200 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.948 | 3.948 |
| Systems Engineering | WR | SSC : San Diego, CA | 0.892 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.892 | - |
| Licenses | Various | SSC : San Diego, CA | 0.700 | 0.100 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.800 | 0.700 |
| Software Development | C/CPFF | SSC : SSC: Norfolk, VA | 68.900 | 0.480 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 69.380 | 69.380 |
| Software Development | C/CPFF | Various : San Diego, CA | 7.812 | 0.971 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.783 | 7.812 |
| Software Development | C/CPFF | DTIC : Fort Belvoir, VA | 1.592 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.592 | - |
| Software Development | C/CPFF | GTRI : Atlanta, GA | 2.083 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.083 | - |
| Analysis of Alternatives | Various | SSC : San Diego, CA | 2.055 | 0.830 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.885 | - |
| Detailed Business Process Re-engineering | Various | NAVAIR : Pax River, CA | 0.862 | 0.924 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.786 | - |
| Integrated Logistics Support | C/CPFF | SeaPort : San Diego, CA | 1.355 | 0.400 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.755 | 1.755 |
| Configuration Management | WR | SSC : San Diego, CA | 0.460 | 0.050 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.510 | 0.460 |
| Technical Data | WR | SSC : San Diego, CA | 0.200 | 0.050 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.250 | 0.200 |
| | | **Subtotal** | 91.327 | 4.005 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 95.332 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWC : Patuxent River, MD | 1.374 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.374 | 1.374 |
| Developmental Test & Evaluation | WR | SPAWAR FRD : San Diego, CA | 0.420 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.420 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3032 / *NTCSS (Naval Tactical Command Spt Sys)* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation Cyber | WR | SSC : San Diego, CA | 1.426 | 0.200 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.626 | 1.626 |
| Developmental Test & Evaluation | WR | NAVSUP : Mechanicsburg, PA | 0.000 | 0.050 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| | | **Subtotal** | 3.220 | 0.250 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.470 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | C/CPFF | SeaPort : San Diego, CA | 0.896 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.896 | 0.896 |
| Government Engineering Support | WR | SSC : San Diego, CA | 0.279 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.279 | 0.279 |
| Program Management Support | C/CPFF | SeaPort : San Diego, CA | 2.183 | 0.200 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.383 | 2.383 |
| | | **Subtotal** | 3.358 | 0.200 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.558 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 97.905 | 4.455 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 102.360 | N/A |

**Remarks**

| **Exhibit R-4, RDT&E Schedule Profile:** PB 2020 Navy | | **Date:** March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3032 / *NTCSS (Naval Tactical Command Spt Sys)* |

| Fiscal Year | 2018 | | | | 2019 | | | | 2020 | | | | 2021 | | | | 2022 | | | | 2023 | | | | 2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Acquisition Milestones**<br>NTCSS Open Architecture (OA) | | Rel 1/2 FD △ | | | | | Rel 3 FD △ | | | | | | | | | | | | | | | | | | | | | |
| **Engineering Milestones**<br>NTCSS OA Release 1 BCM-Interdiction | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NTCSS OA Release 2 Global ICRL | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NTCSS OA Release 3 Operational Supply (TOA/PGI) | | | | | TRR RRR △ | | | | | | | | | | | | | | | | | | | | | | | |
| NTCSS Web-Enabled (RSUP/OIMA/OOMA) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Test & Evaluation Milestones**<br>NTCSS OA | Rel 1/2 DT △ | | | | | Rel 3 DT △ | | | | | | | | | | | | | | | | | | | | | | |
| **Software Deliveries**<br>NTCSS OA | | Rel 1/2 △ | | | | | Rel 3 △ | | | | | | | | | | | | | | | | | | | | | |
| NTCSS Web-Enabled | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

DT - Developmental Test
FD - Field Decision
OT - Operational Test
RRR - Release Readiness Review
TRR - Test Readiness Review

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3032 / *NTCSS (Naval Tactical Command Spt Sys)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3032*** | | | | |
| NTCSS OA Build 1 - Development Test (DT) | 1 | 2018 | 1 | 2018 |
| NTCSS OA Build 2 - Development Test (DT) | 1 | 2018 | 1 | 2018 |
| NTCSS OA Build 1 - Field Decision | 2 | 2018 | 2 | 2018 |
| NTCSS OA Build 2 - Field Decision | 2 | 2018 | 2 | 2018 |
| NTCSS OA Build 1 - Software Delivery | 2 | 2018 | 2 | 2018 |
| NTCSS OA Build 2 - Software Delivery | 2 | 2018 | 2 | 2018 |
| NTCSS OA Build 3 - Test Readiness Review (TRR) | 1 | 2019 | 1 | 2019 |
| NTCSS OA Build 3 - Release Readiness Review (RRR) | 1 | 2019 | 1 | 2019 |
| NTCSS OA Build 3 - Development Test (DT) | 2 | 2019 | 2 | 2019 |
| NTCSS OA Build 3 - Field Decision | 3 | 2019 | 3 | 2019 |
| NTCSS OA Build 3 - Software Delivery | 3 | 2019 | 3 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3050 / *Deployable JT Command and Control* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3050: *Deployable JT Command and Control* | 0.000 | 0.000 | 0.000 | 3.159 | - | 3.159 | 3.225 | 3.299 | 3.363 | 3.431 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604231N from PE 0607700N Project 3050 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

Deployable Joint Command and Control (DJC2) provides a self-contained, standardized, rapidly deployable, modular, scalable, and reconfigurable joint command and control (C2) capability to designated Geographic Combatant Commands (GCCs). DJC2 is the materiel solution to Defense Planning Guidance that called for the development of standing Joint Task Forces (JTFs) with a deployable C2 capability. DJC2 will ensure that Joint Force Commanders (JFC) are equipped, as well as trained and organized, to carry out their C2 responsibilities. DJC2 provides GCCs and JFCs a mission critical, integrated family of systems with which to plan, control, coordinate, execute, and assess operations. It is designed to deploy rapidly, set up within hours, and quickly provide necessary C2 mission and collaboration functionality across the full spectrum of JTF operations. The DJC2 has also been deployed in support of Humanitarian Assistance and Disaster Relief (HA/DR) efforts. The capability is intended for all levels of conflict and will be reconfigurable to meet specific GCC and JTF mission requirements. This capability is interoperable with higher and adjacent echelons of command (to include coalition allies) as well as with supporting elements to include joint forces. Note that DJC2 is not a follow-on or replacement system for the Joint Global Command and Control Systems (GCCS-J); rather, DJC2 employs a GCCS in its suite of applications, ensuring interoperability with the worldwide-installed base of GCCS-J.

FY20 funding supports development of efforts for systems engineering, integration, and DJC2 Test Bed. Focus areas include development efforts of emerging cyber security technologies.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Engineering & Integration | 0.000 | 0.000 | 1.418 | 0.000 | 1.418 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0607700N, Project 3050 | | | | | |
| ***FY 2020 Base Plans:***<br>Continue to develop system enhancements in support of Information Assurance, Assured Command & Control, and Advanced Extremely High Frequency (A-EHF) voice and data solution to enhance Command & Control | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| capabilities in denied and degraded environments. Commence development efforts to incorporate Link 16, Virtual Secure Enclave, and Automated Network capabilities into DJC2. Continue efforts to a Mission Partner Environment (MPE) aligned common system architecture with Tactical Processing Node (TPN) capability via virtualized Software Defined Networks (SDN) with fine-grained application access and control.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0607700N, Project 3050 was $1.398. Funding increase by $0.020M to $1.418M in FY20. Increase will support required testing and evaluation of system enhancements. | | | | | |
| ***Title:*** DJC2 RDT&E Test Bed<br>***Articles:***<br>***FY 2019 Plans:***<br>FY19 Plans funded under PE 0607700N, Project 3050<br>***FY 2020 Base Plans:***<br>Continue testing in support of enhanced Information Assurance to include Automated Cyber Security testing, automated system vulnerability patching download, and system micro-segmentation. Demonstrate Advanced Extremely High Frequency (A-EHF) voice and data solution to enhance Command & Control capabilities in denied and degraded environments. Demonstrate Link 16, Virtual Secure Enclave, and Automated Network capabilities. Demonstrate a Mission Partner Environment (MPE) aligned common system architecture with Tactical Processing Node (TPN) capability via virtualized Software Defined Networks (SDN) with fine-grained application access and control.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0607700N, Project 3050 was $1.729. Funding increase by $0.012M to $1.741M in FY20. Increase will support required testing and evaluation of system enhancements. | 0.000<br>- | 0.000<br>- | 1.741<br>- | 0.000<br>- | 1.741<br>- |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 3.159 | 0.000 | 3.159 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN /2906: *DJC2* | 2.934 | 2.666 | 5.860 | - | 5.860 | 2.293 | 2.068 | 2.110 | 2.152 | Continuing | Continuing |
| • RDTEN/0607700N/3050: *DJC2* | 3.093 | 3.127 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.054 |

**Remarks**

**D. Acquisition Strategy**

This RDT&E line supports an evolutionary acquisition strategy. The intent of this strategy is to: develop a system based upon a current understanding of joint requirements; rapidly field systems based upon those requirements; analyze operational utilization of the systems; and roll the results of the analysis into periodic upgrades of the systems to maintain currency and maximize operational effectiveness. Efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion. The baseline configuration is based upon existing Command, Control, Communications, Computers, & Intelligence (C4I) systems, scaled to the Combatant Command level. The follow-on configurations will include newly developed capabilities based on emergent, joint requirements and operational feedback based upon utilization of earlier delivered systems. Ultimately, the goal is to perform quick and affordable integration of emergent transformational COTS and GOTS technologies in support of information warfare and overall efforts required to pace the threat. This is accomplished via technical analyses and engineering efforts associated with implementation of new technology to enable rapid introduction of new products and technology, prevent obsolescence, and end of support issues enhancements via incremental software & hardware upgrades delivered on annual build release

**E. Performance Metrics**

The Deployable Joint Command and Control (DJC2) program continues to identify, evaluate and test a minimum of 3 - 5 new technologies per year based on emergent / joint requirements for potential insertion into the DJC2 system upgrade plan.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3050 / *Deployable JT Command and Control* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NSWC : PCD | 0.000 | 0.000 | | 0.000 | | 0.440 | Dec 2019 | - | | 0.440 | Continuing | Continuing | Continuing |
| Hardware/Software Development | C/CPAF | GTRI : Atlanta, GA | 0.000 | 0.000 | | 0.000 | | 0.750 | Dec 2019 | - | | 0.750 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.190 | | - | | 1.190 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0607700N Project 3050

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Integration | WR | NSWC : PCD | 0.000 | 0.000 | | 0.000 | | 0.411 | Dec 2019 | - | | 0.411 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.411 | | - | | 0.411 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & | WR | NSWC : PCD | 0.000 | 0.000 | | 0.000 | | 0.890 | Dec 2019 | - | | 0.890 | Continuing | Continuing | Continuing |
| Operational Test & | WR | NSWC : PCD | 0.000 | 0.000 | | 0.000 | | 0.500 | Dec 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.390 | | - | | 1.390 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

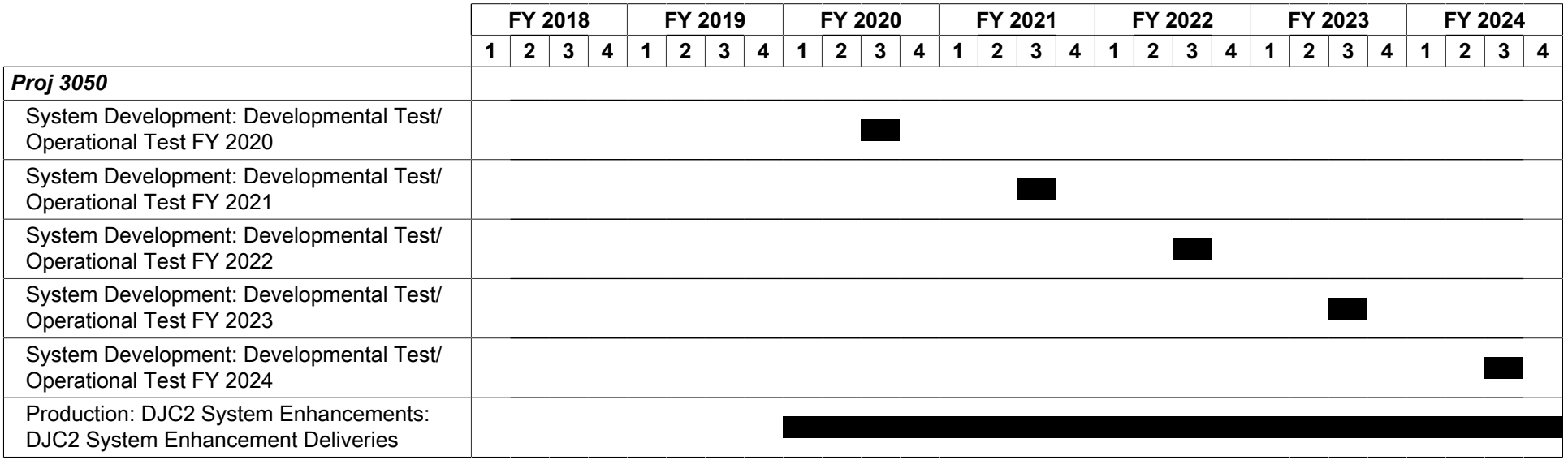
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.168 | Dec 2019 | - | | 0.168 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.168 | | - | | 0.168 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3050 / *Deployable JT Command and Control* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 3.159 | | - | | 3.159 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3050 / *Deployable JT Command and Control* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3050*** | | | | |
| System Development: Developmental Test/Operational Test FY 2020 | 3 | 2020 | 3 | 2020 |
| System Development: Developmental Test/Operational Test FY 2021 | 3 | 2021 | 3 | 2021 |
| System Development: Developmental Test/Operational Test FY 2022 | 3 | 2022 | 3 | 2022 |
| System Development: Developmental Test/Operational Test FY 2023 | 3 | 2023 | 3 | 2023 |
| System Development: Developmental Test/Operational Test FY 2024 | 3 | 2024 | 3 | 2024 |
| Production: DJC2 System Enhancements: DJC2 System Enhancement Deliveries | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3260: *Naval Operations Business Logistics Enterprise (NOBLE)* | 0.000 | 12.656 | 34.491 | 38.366 | - | 38.366 | 32.249 | 14.276 | 6.346 | 6.480 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This project develops and improves the Navy's tactical support information systems. It includes Naval Operational Supply System (NOSS), Naval Aviation Maintenance System (NAMS), Naval Operational Maintenance Enterprise (NOME), and Naval Administration and Personnel System (NAPS).

NOSS will provide enterprise-wide automation of supply, inventory, and financial functions to the Naval supply system. NOSS incorporates commercial best practices (e.g., Amazon, Wal-Mart, UPS, FedEx, etc.); NOSS will aggregate and analyze logistics data using business intelligence technologies, provide for total asset visibility, optimize business processes at the tactical echelon (field-level) and enterprise support activities, accelerate the ordering/re-ordering process, and permit monitoring of shipments. NOSS will maintain compliance with statutory, regulatory, and policy mandates of Financial Improvement Audit Requirements (FIAR). NOSS will aggregate and analyze operational data in a Business Intelligence (BI) framework to enable historical and predictive common operating pictures for logistics and readiness performance and requirements. FY2020 funding provides for the continuation of the Acquisition Testing & Development phase of software development culminating in obtaining Authority To Operate (ATO) accreditation and Functional Manager Certification (FMC).

NAMS will provide an enterprise-wide aviation maintenance support capability that services all levels of aviation maintenance (organizational, intermediate, and depot) for over 2,100 Navy and Marine Corps aircraft. NAMS will identify and assign aviation artisans, and track all levels of aviation maintenance to completion. Aircraft availability and mission-capable rates will increase with the elimination of current inefficiencies; there will be a reduction in total ownership costs. FY2020 funding provides for the continuation of the Acquisition Testing & Development phase of software development culminating in obtaining Authority To Operate (ATO) accreditation and Functional Manager Certification (FMC).

NOME will provide standardized operational business processes for afloat maritime maintenance activities to all naval ships. NOME will provide end-to-end component tracking, reduce administration time by identifying and assigning artisans to repair shipboard equipment, support moving major repair work ashore, and enable exploitation of embedded sensors in weapon systems that will trigger repair action notification. FY2020 funding provides for the continuation of the Acquisition Testing & Development phase of software development culminating in obtaining Authority To Operate (ATO) accreditation and Functional Manager Certification (FMC).

NAPS will provide Navy-wide personnel and administration data sharing across shipboard and shore-based information systems. This will eliminate redundant personnel data entry, reduce total ownership costs, and standardize the way personnel and administration data are shared across the Navy. NAPS provides for the efficient use of maintenance personnel with better job/task and personnel skill matching.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Naval Operational Supply System (NOSS) | 8.506 | 17.572 | 17.436 | 0.000 | 17.436 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Award an OTA and conduct testing and evaluation of NOSS prototype to include testing supply functional requirements and establishment of a Department of the Navy (DON) commercial cloud computing environment and Integrated Data Environment. If the prototype is successful conduct an Acquisition Authority to Proceed (A-ATP) to support a production contract and commence the Acquisition Testing & Deployment phase for NOSS capabilities. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue the Acquisition Testing & Deployment phase of NOSS software development to include, Test & Evaluation Master Plan (TEMP) development, Life Cycle Sustainment Planning, assess vulnerability to cyber attacks in support of obtaining an Authority To Operate (ATO) accreditation, validate production requirements, training development, conduct Application<br>Integration testing in the Consolidated Afloat Network and Enterprise Services (CANES) and Agile Core Services (ACS) environment, and conduct Functional Manager Certification (FMC). Continue NOSS software development<br>effort to develop/design an Integrated Data Environment (IDE), which will be leveraged by NAMS and NOME. NOSS will subsume 14 legacy applications and support approximately 1000 sites. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding for NOSS due to ramp up in training development, and conduct Application Integration testing in the Consolidated Afloat Network and Enterprise Services (CANES) and Agile Core Services (ACS) environment. | | | | | |
| ***Title:*** Naval Aviation Maintenance System (NAMS) | 4.150 | 7.359 | 11.090 | 0.000 | 11.090 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Award an OTA and conduct testing and evaluation of NAMS prototype and if successful conduct an Acquisition Authority to Proceed (A-ATP) to support a production contract and commence the Acquisition Testing & Deployment phase for NAMS capabilities.<br>***FY 2020 Base Plans:***<br>Continue the Acquisition Testing & Deployment phase of NAMS software development to include, Test & Evaluation Master Plan (TEMP) development, Life Cycle Sustainment Planning, assess vulnerability to cyber attacks in support of obtaining an Authority To Operate (ATO) accreditation, validation of production requirements, training development, integration efforts with the Aviation Logistics Environment (ALE), conduct Application Integration testing in the Consolidated Afloat Network and Enterprise Services (CANES) and Agile Core Services (ACS) environment, and conduct Functional Manager Certification (FMC). NAMS will subsume 2 legacy applications and will support 338 sites.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding for NAMS due to ramp up in training development, integration efforts with the Aviation Logistics Environment (ALE), and conducting Application Integration testing in the Consolidated Afloat Network and Enterprise Services (CANES) and Agile Core Services (ACS) environment. | | | | | |
| ***Title:*** Naval Operational Maintenance Enterprise (NOME)<br>***Articles:***<br>***FY 2019 Plans:***<br>Prepare/develop acquisition documentation in support of a Request For Solution (RFS) and award of an Other Transaction Agreement (OTA) to prototype vendor software to meet NOME capability requirements. Conduct an Acquisition Authority to Proceed (A-ATP) to support a production contract and commence the Acquisition Testing & Deployment phase for NOME capabilities.<br>***FY 2020 Base Plans:***<br>Continue the Acquisition Testing & Deployment phase of NOME software development to include, Test & Evaluation Master Plan (TEMP) development, Life Cycle Sustainment Planning, assess vulnerability to cyber attacks in support of obtaining an Authority To Operate (ATO) accreditation, validate production requirements, training development, conduct Application | 0.000<br>- | 9.560<br>- | 9.840<br>- | 0.000<br>- | 9.840<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Integration testing in the Consolidated Afloat Network and Enterprise Services (CANES) and Agile Core Services (ACS) environment, and conduct Functional Manager Certification (FMC). NOME will subsume 2 legacy applications and will support 260 sites.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding for NOME due to ramp up in training development, and conducting Application Integration testing in the Consolidated Afloat Network and Enterprise Services (CANES) and Agile Core Services (ACS) environment. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 12.656 | 34.491 | 38.366 | 0.000 | 38.366 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2611: *Naval Tactical Command Support System* | 10.570 | 10.991 | 15.154 | - | 15.154 | 15.211 | 16.187 | 17.750 | 18.102 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

NOBLE will employ an evolutionary acquisition strategy. Software development will be comprised of multiple builds, each with increasing net-centric services capability. NOBLE is planned as a software-only program, dependent on the Navy Common Computing Environment (CCE). Hardware infrastructure will be provided by CANES, Integrated Shipboard Network System (ISNS), Navy Marine Corps Intranet (NMCI), Next Generation Enterprise Network (NGEN), OneNET (the OCONUS (outside of continental United States) network), and the Department of Navy commercial cloud computing environments. NOBLE's primary contracting method for software development will be competitive award.

**E. Performance Metrics**

Successfully achieve Acquisition Authority To Proceed (A-ATP) and Full Deployment ATP (FDATP) for NOSS, NAMS and NOME.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOME Software Development | C/CPFF | PEO STRI : Orlando, FL | 0.000 | 0.000 | | 5.000 | Dec 2018 | 4.590 | Oct 2019 | - | | 4.590 | Continuing | Continuing | Continuing |
| NAMS Software Development | C/CPFF | PEO STRI : Orlando, FL | 0.000 | 0.000 | | 2.699 | Dec 2018 | 5.840 | Oct 2019 | - | | 5.840 | Continuing | Continuing | Continuing |
| NOSS Software Development | C/CPFF | PEO STRI : Orlando, FL | 0.000 | 1.500 | Sep 2018 | 11.912 | Dec 2018 | 11.186 | Oct 2019 | - | | 11.186 | Continuing | Continuing | Continuing |
| NOME System Engineering | WR | SPAWARSYSCEN LANT : Norfolk, VA | 0.000 | 0.000 | | 1.440 | Dec 2018 | 1.500 | Oct 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| NOSS System Engineering | WR | SPAWARSYSCEN LANT : Norfolk, VA | 0.000 | 0.704 | Oct 2017 | 1.440 | Oct 2018 | 1.500 | Oct 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| NOSS System Engineering | WR | USFFC : Norfolk, VA | 0.000 | 0.746 | Dec 2017 | 1.000 | Dec 2018 | 1.000 | Dec 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| NAMS Detailed BPR | C/CPFF | NAVAIR : Patuxent River, MD | 0.000 | 0.849 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| NAMS System Engineering | WR | SPAWARSYSCEN LANT : Norfolk, VA | 0.000 | 0.750 | Oct 2017 | 1.440 | Oct 2018 | 1.500 | Oct 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| NAMS Analyis of Alternatives (AoA) | C/CPFF | SeaPort : San Diego, CA | 0.000 | 0.537 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| NAMS Analyis of Alternatives (AoA) | C/CPFF | WHQS : Washington DC | 0.000 | 0.539 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 5.625 | | 24.931 | | 27.116 | | - | | 27.116 | Continuing | Continuing | N/A |

**Remarks**

FY20 product development increase is due to increased software development and engineering efforts across the NOBLE portfolio.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOME Developmental Test & Evaluation | WR | NAVSEA : Washington, D.C. | 0.000 | 0.000 | | 0.200 | Dec 2018 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| NOME Operational Test & Evaluation | WR | COTF : Norfolk, VA | 0.000 | 0.000 | | 0.200 | Mar 2019 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAMS Developmental Test & Evaluation | WR | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.250 | Oct 2018 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| NAMS Operational Test & Evaluation | WR | COTF : Norfolk, VA | 0.000 | 0.000 | | 0.250 | Mar 2019 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| NOSS Developmental Test & Evaluation (Documentation) | WR | NAVSUP : Mechanicsburg, PA | 0.000 | 0.250 | Oct 2017 | 0.250 | Oct 2018 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| NOSS Operational Test & Evaluation (Documentation) | WR | COTF : Norfolk, VA | 0.000 | 0.250 | Oct 2017 | 0.250 | Mar 2019 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.500 | | 1.400 | | 1.500 | | - | | 1.500 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOME System Engineering Support | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 1.120 | Dec 2018 | 1.500 | Oct 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| NOSS System Engineering Support | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 1.390 | Oct 2017 | 1.120 | Oct 2018 | 1.500 | Oct 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| NAMS System Engineering Support | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.250 | Oct 2017 | 1.120 | Oct 2018 | 1.500 | Oct 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| NOSS Systems Engineering Support | C/CPFF | SeaPort : San Diego, CA | 0.000 | 2.666 | Oct 2017 | 0.600 | Dec 2018 | 0.750 | Oct 2019 | - | | 0.750 | Continuing | Continuing | Continuing |
| NAMS Systems Engineering Support | C/CPFF | SeaPort : San Diego, CA | 0.000 | 0.225 | Oct 2017 | 0.600 | Dec 2018 | 0.750 | Oct 2019 | - | | 0.750 | Continuing | Continuing | Continuing |
| NOME Systems Engineering Support | C/CPFF | SeaPort : San Diego, CA | 0.000 | 0.000 | | 0.600 | Dec 2018 | 0.750 | Oct 2019 | - | | 0.750 | Continuing | Continuing | Continuing |
| NOME Program Management Support | C/CPFF | SeaPort : San Diego, CA | 0.000 | 0.000 | | 1.000 | Dec 2018 | 1.000 | Oct 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| NOSS Program Management Support | C/CPFF | SeaPort : San Diego, CA | 0.000 | 1.000 | Nov 2017 | 1.000 | Dec 2018 | 1.000 | Oct 2019 | - | | 1.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |

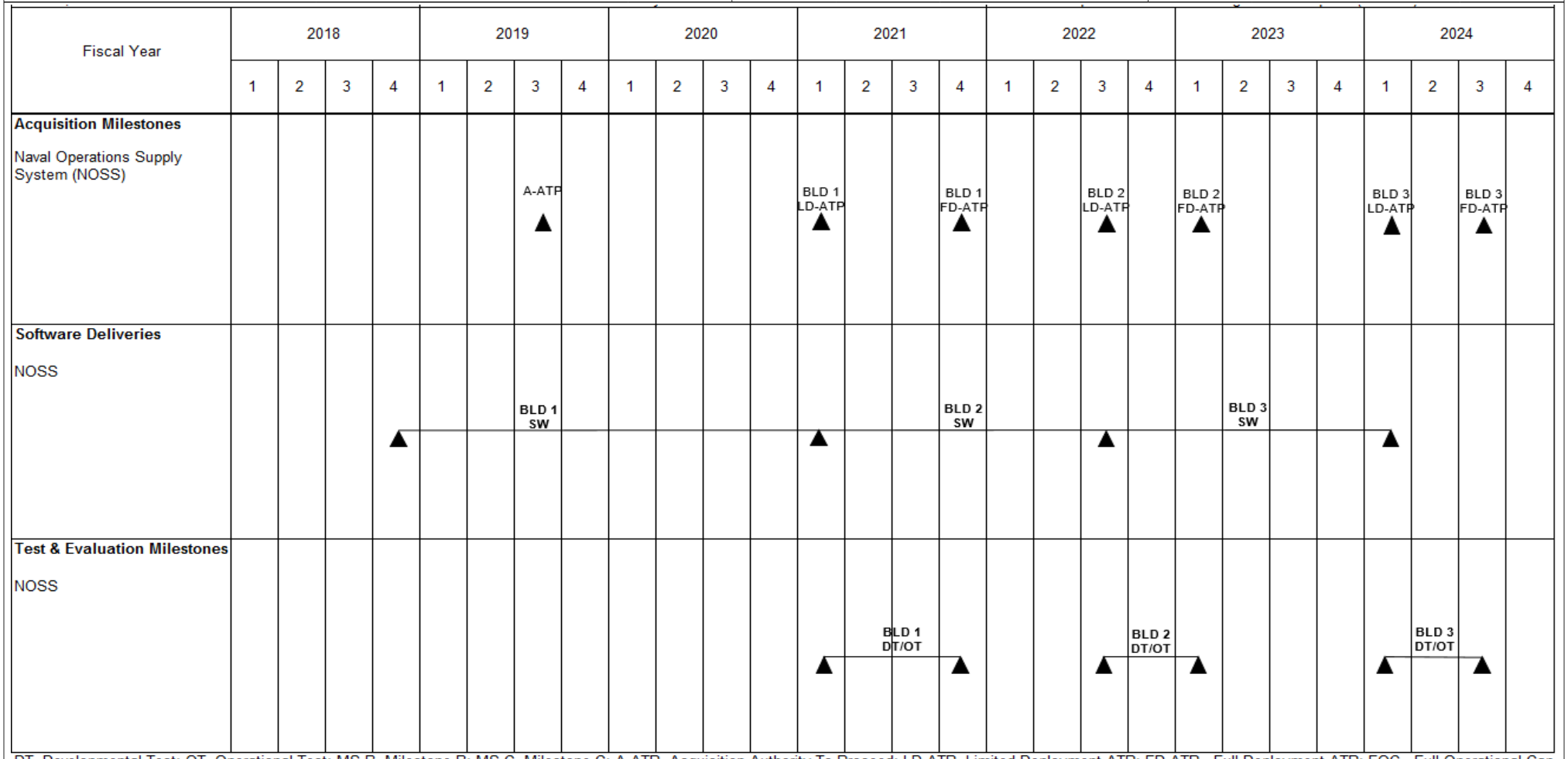
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAMS Program Management Support | C/CPFF | SeaPort : San Diego, CA | 0.000 | 1.000 | Nov 2017 | 1.000 | Dec 2018 | 1.000 | Oct 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 6.531 | | 8.160 | | 9.750 | | - | | 9.750 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 12.656 | | 34.491 | | 38.366 | | - | | 38.366 | Continuing | Continuing | N/A |

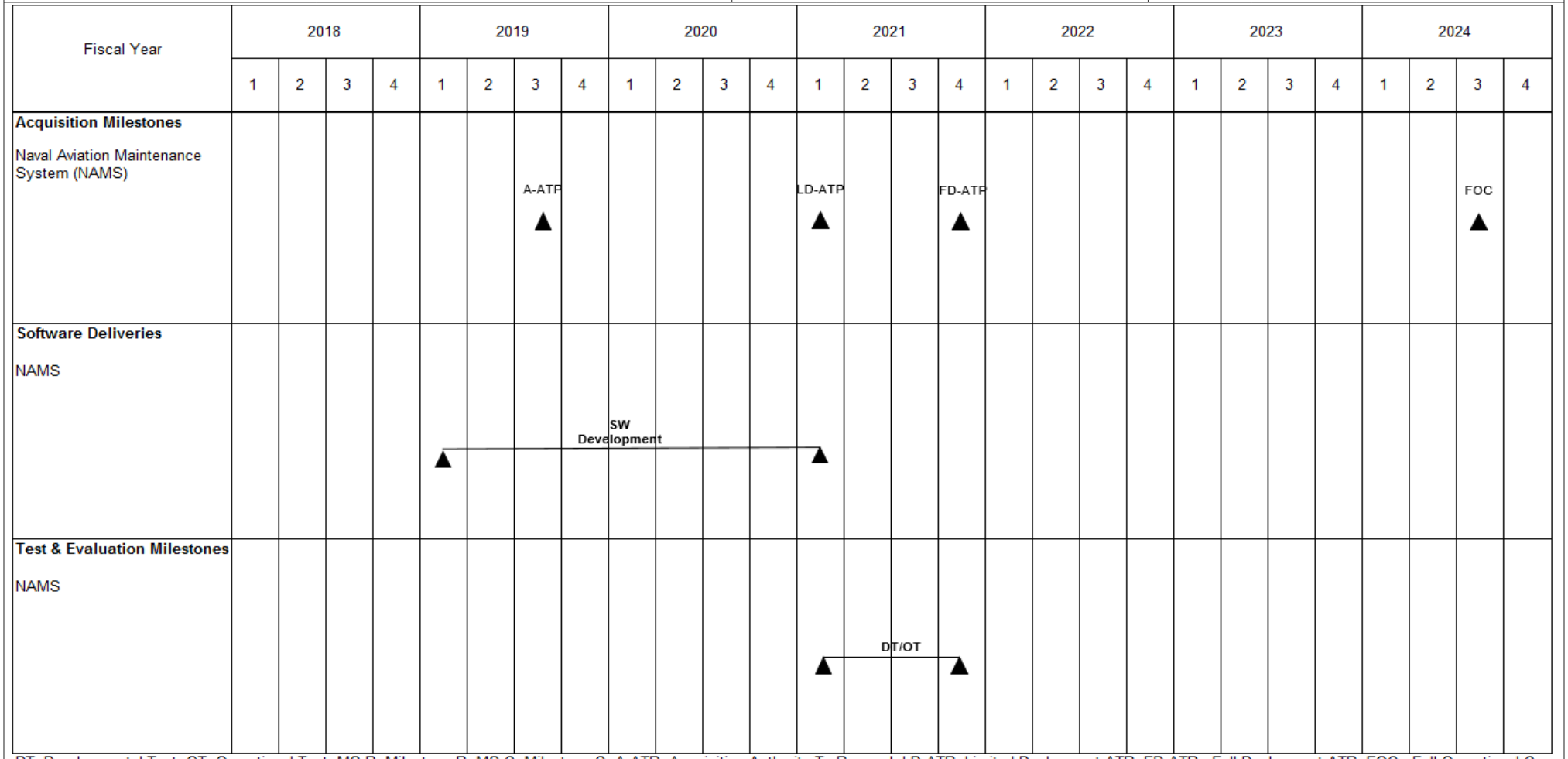
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |



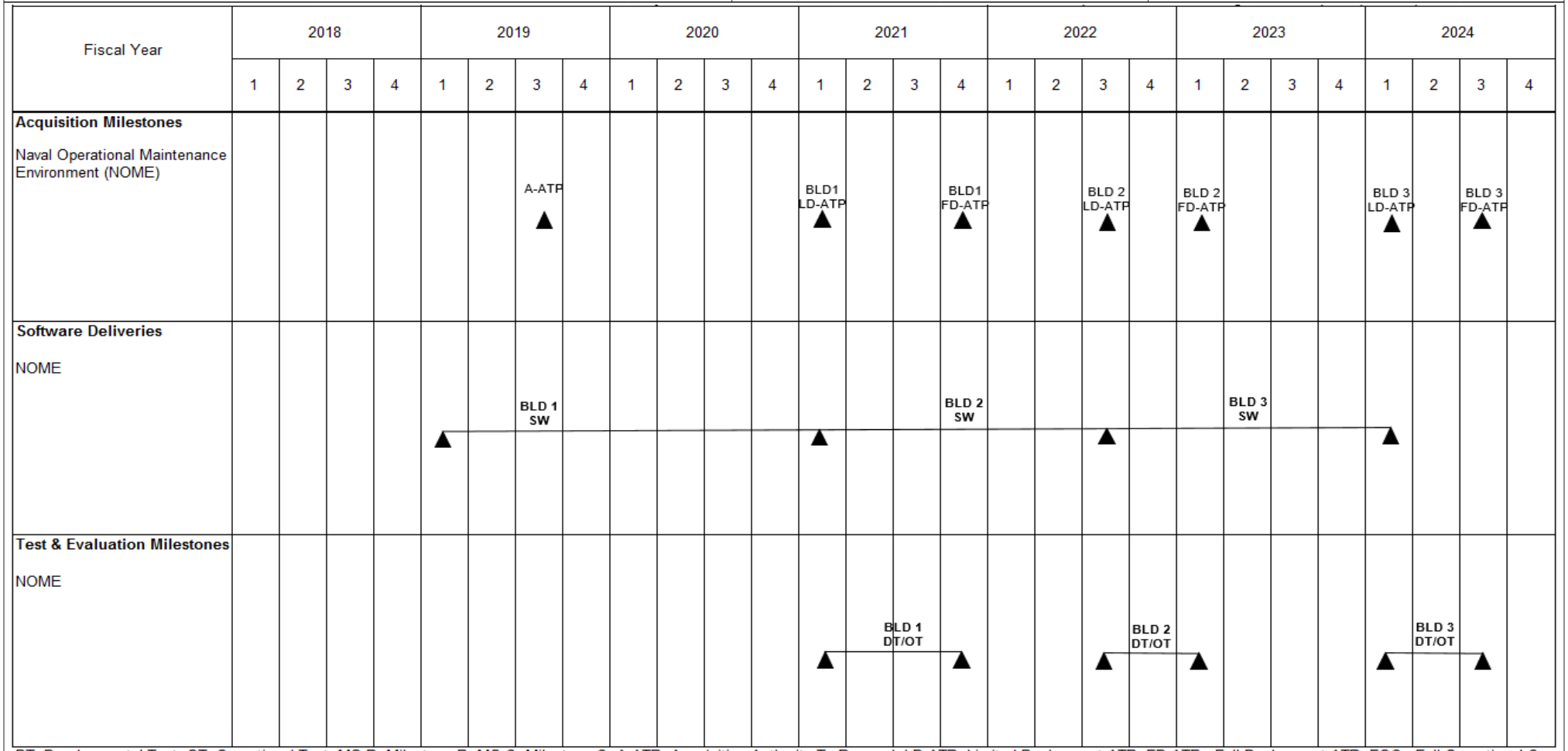

DT- Developmental Test; OT- Operational Test; MS B- Milestone B; MS C- Milestone C; A-ATP- Acquisition Authority To Proceed; LD-ATP- Limited Deployment ATP; FD ATP - Full Deployment ATP; FOC - Full Operational Cap

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* | |




DT- Developmental Test; OT- Operational Test; MS B- Milestone B; MS C- Milestone C; A-ATP- Acquisition Authority To Proceed; LD-ATP- Limited Deployment ATP; FD ATP - Full Deployment ATP; FOC - Full Operational Cap

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |




DT- Developmental Test; OT- Operational Test; MS B- Milestone B; MS C- Milestone C; A-ATP- Acquisition Authority To Proceed; LD-ATP- Limited Deployment ATP; FD ATP - Full Deployment ATP; FOC - Full Operational Cap

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3260*** | | | | |
| Naval Operational Supply System (NOSS) Build 1 Software Development | 4 | 2018 | 1 | 2021 |
| Naval Operational Supply System (NOSS) Build 2 Software Development | 1 | 2021 | 3 | 2022 |
| Naval Operational Supply System (NOSS) Build 3 Software Development | 3 | 2022 | 1 | 2024 |
| Naval Operational Maintenance Enterprise (NOME) Build 1 Software Development | 1 | 2019 | 1 | 2021 |
| Naval Operational Maintenance Enterprise (NOME) Build 2 Software Development | 1 | 2021 | 3 | 2022 |
| Naval Operational Maintenance Enterprise (NOME) Build 3 Software Development | 3 | 2022 | 1 | 2024 |
| Naval Aviation Maintenance System (NAMS) Software Development | 1 | 2019 | 1 | 2021 |
| NOSS Acquisition Authority To Proceed (A-ATP) | 3 | 2019 | 3 | 2019 |
| NAMS Acquisition Authority To Proceed (A-ATP) | 3 | 2019 | 3 | 2019 |
| NOME Acquisition Authority To Proceed (A-ATP) | 3 | 2019 | 3 | 2019 |
| NOSS Build 1 Limited Deployment ATP | 1 | 2021 | 1 | 2021 |
| NOSS Build 2 Limited Deployment ATP | 3 | 2022 | 3 | 2022 |
| NOSS Build 3 Limited Deployment ATP | 1 | 2024 | 1 | 2024 |
| NAMS Limited Deployment ATP | 1 | 2021 | 1 | 2021 |
| NOME Build 1 Limited Deployment ATP | 1 | 2021 | 1 | 2021 |
| NOME Build 2 Limited Deployment ATP | 3 | 2022 | 3 | 2022 |
| NOME Build 3 Limited Deployment ATP | 1 | 2024 | 1 | 2024 |
| NOSS Build 1 Developmental Test/Operational Test (DT/OT) | 1 | 2021 | 4 | 2021 |
| NOSS Build 2 Developmental Test/Operational Test (DT/OT) | 3 | 2022 | 1 | 2023 |
| NOSS Build 3 Developmental Test/Operational Test (DT/OT) | 1 | 2024 | 3 | 2024 |
| NAMS Developmental Test/Operational Test (DT/OT) | 1 | 2021 | 4 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3260 / *Naval Operations Business Logistics Enterprise (NOBLE)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| NOME Build 1 Developmental Test/Operational Test (DT/OT) | 1 | 2021 | 4 | 2021 |
| NOME Build 2 Developmental Test/Operational Test (DT/OT) | 3 | 2022 | 1 | 2023 |
| NOME Build 3 Developmental Test/Operational Test (DT/OT) | 1 | 2024 | 3 | 2024 |
| NOSS Build 1 Full Deployment ATP | 4 | 2021 | 4 | 2021 |
| NOSS Build 2 Full Deployment ATP | 1 | 2023 | 1 | 2023 |
| NOSS Build 3 Full Deployment ATP | 3 | 2024 | 3 | 2024 |
| NAMS Full Deployment ATP | 4 | 2021 | 4 | 2021 |
| NOME Build 1 Full Deployment ATP | 4 | 2021 | 4 | 2021 |
| NOME Build 2 Full Deployment ATP | 1 | 2023 | 1 | 2023 |
| NOME Build 3 Full Deployment ATP | 3 | 2024 | 3 | 2024 |
| NAMS Full Operational Capability (FOC) | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3323 / *Maritime Tactical Command & Control (MTC2)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3323: *Maritime Tactical Command & Control (MTC2)* | 59.856 | 12.885 | 11.951 | 8.659 | - | 8.659 | 8.761 | 9.035 | 9.275 | 9.461 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Maritime Tactical Command and Control (MTC2) is a next generation Command and Control (C2) software program that will deliver Battle Management Aids (BMA) and Maritime Planning Tools (MPT) to dynamically plan, direct, monitor, and assess maritime operations in support of Joint, Multi-Service, and Coalition Force planning. MTC2 will leverage a System of Services (SoServ) to deliver capabilities improving decision speed and dynamic synchronization of forces. BMAs / MPTs are small, capability-focused deliveries that can be rapidly developed, tested, and fielded. MTC2 will leverage Science and Technology (S&T) investments and will engage with the Navy Requirements Governance Board (RGB) to define and prioritize the BMAs and MPTs that MTC2 will deliver and align to the Program Executive Office (PEO) Command, Control, Communications, and Intelligence (C4I) enterprise architecture (Consolidated Afloat Network Enterprise Service (CANES), Agile Core Services (ACS)) for fielding to all echelons of command (Afloat and Ashore) within the Navy. The program's objective is to provide a suite of maritime applications (BMAs / MPTs) that enable planning, execution, monitoring, and assessment in support of operational and tactical level of war requirements. MTC2 will field BMAs / MPTs designed to provide automated and structured support for tactical and operational planning, decision-making, and execution. As a software-only program that leverages enterprise infrastructure, MTC2 will provide new and improved capabilities to include an Operational Planning Tool (OPT), an improved browser enabled map visualization that will enable the warfighter to associate tracks to relevant data, past and predicted movements, ingest Meteorology and Oceanography information, and operational overlays. MTC2's updated architecture will enable future composable C2 capabilities to respond with a more rapid pace in changes in threats and technology. MTC2 is the Navy's solution to Global Force Management - Data Initiative (GFM-DI) which is Department of Defense (DoD) -wide enterprise solution that enables visibility/accessibility/ sharing of data applicable to the entire DoD force structure. MTC2 will incorporate distributed data transfer capability for enhanced operational data exchange between command and control systems, combat systems, logistics, and intelligence systems for timely threat identification, location, and status alongside blue force data.

FY 2020 funding will provide development, integration and testing, certification to include Risk Management Framework (RMF), and fielding of additional capabilities (BMAs / MPTs) and support the Navy's allocation requirement to the DoD Joint GFM effort on the MTC2 Secure Internet Protocol Router Network (SIPRNET) Development Environment. OPT will provide capability for a Carrier Strike Group (CSG) and be extended to include Maritime Operations Center (MOC) scheduling, to create cohesive operations plans/schedules. The Navy Wave BMA will provide collaborative service that allows users to see other distributed planners' edits in real-time, and works in disconnected, intermittent, and limited (DIL) environments. The MTC2 SIPRNET Development Environment will be available to fleet users to enable rapid, real-time feedback on improvements to BMAs / MPTs. MTC2 project prototype baseline comprised of OPT, Navy Wave BMAs / MPTs will be demonstrated at Trident Warrior (TW) 20. In FY 2020, MTC2 will begin to field OPT and Navy Wave capabilities to a Aircraft Carrier, Fixed Wing, Nuclear Powered (CVN) to achieve Initial Operational Capability (IOC) and will field GFM capability to meet the Navy's allocation requirement to support DoD Joint GFM.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Maritime Tactical Command and Control (MTC2) | 12.885 | 11.951 | 8.659 | 0.000 | 8.659 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3323 / *Maritime Tactical Command & Control (MTC2)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>MTC2 will deliver Ashore/Afloat prototype of the program of record capability to a Carrier Strike Group (CSG) and/or Maritime Operations Center (MOC); continue development to align to PEO C4I enterprise architecture (CANES / ACS). MTC2 will continue working with fleet users for development, integration, and testing for additional capabilities (BMAs / MPT) to include the Maintain Naval Force Status capability. MTC2 will develop, test, and integrate multiple data feeds and interfaces to summarize unit network and communication status, unit readiness, and unit equipment status. Data that is integrated into MTC2 will be displayed simultaneously in a capabilities and characteristics status display known as the "Baseball Card", which will require Human Factors Engineering (HFE) in addition to development, integration, and test. MTC2 will host fleet users in working sessions and incorporate HFE and development updates for BMA / MPT improvements. MTC2 will demonstrate capabilities at TW 19. MTC2 will continue integration and testing of Global Force Management - Data Initiative (GFM-DI) capabilities for transition into the MTC2 prototype software baseline for fielding. MTC2 was selected as the Navy's Program of Record (PoR) system to support the "National Defense Authorization Act (NDAA) FY18 Section (SEC) 874 Software Development Pilot Program Using Agile Best Practices" with the results of the pilot to enable the Department of Defense (DoD) to capture lessons learned; identify and eliminate road blocks; and inform policy, guidance, training, and workforce development. The pilot will focus on the GFM-DI capability related to the scheduling of Naval group compositions, such as CSG or (Amphibious Ready Group) ARG. MTC2 will leverage agile development best practices for this effort with an initial delivery to United States Fleet Forces (USFF). MTC2 will collect user feedback which will be added to the PoR backlog to be incorporated into future software releases. | | | | | |
| ***FY 2020 Base Plans:***<br>MTC2 will begin initial fielding Ashore/Afloat of the Program of Record (PoR) capability to a Carrier Strike Group (CSG) and/or Maritime Operations Center (MOC); continue development aligned to Program Executive Office (PEO) Command, Control, Communications, and Intelligence (C4I) enterprise architecture (CANES / ACS) updates, changes and modifications. MTC2 will continue to receive feedback from fleet users for development, integration, and testing of additional capabilities/enhancements (Battle Management Aids (BMAs) / Maritime Planning Tools (MPT)) to inform the annual build decision. MTC2 will develop, test, and integrate additional data feeds and interfaces as needed for machine-to-machine planning. Data feeds integrated into MTC2 will be displayed seamlessly on a single display for fleet users which will require ongoing Human Factors Engineering (HFE) in addition to development, integration, and test. MTC2 will continue to host fleet users in working sessions and incorporate HFE and development updates for BMA / MPT improvements. MTC2 will | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3323 / *Maritime Tactical Command & Control (MTC2)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| target demonstrations of capabilities at Trident Warrior (TW) 20. MTC2 will continue integration and testing of Global Force Management - Data Initiative (GFM-DI) capabilities for transition into the MTC2 software baseline for fielding. Annual Delivery 2 (Capability Drop 2) was defined in the MTC2 Requirements Governance Board (RGB) Prioritized Focus Areas (signed 16 March 2018) to provide Navy Dynamic Organization to Joint Global Force Management (GFM) community. This capability drop has been accelerated to meet the Joint Global Force Management - Data Initiative (GFM-DI) Allocation mandate to Full Operational Capability (FOC) by FY 2020.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 funding for MTC2 decreases due to direction to align to the new program scope per the Strategic Shift Memo from the Office of the Chief of Naval Operations (OPNAV) dated 28 November 2016. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 12.885 | 11.951 | 8.659 | 0.000 | 8.659 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

MTC2 acquisition strategy will align to DoDI 5000.02 Model 3 Incrementally Deployed Software Intensive Program. MTC2 will execute an agile software development acquisition strategy that is responsive to the fleet needs. Instead of a single Milestone C, software development will be comprised of multiple software releases defined by Capability Drops (CDs) of increasing levels of net-centric services capability, with separate Annual Build Decisions. MTC2 will be software only requiring the information technology infrastructure network and hardware provided by other network centric programs. MTC2's primary contracting method for software development will utilize Space and Naval Warfare (SPAWAR) Systems Command contracts. SPAWAR Systems Center - Pacific (SSC-PAC), San Diego, CA will be the designated Software Support Activity (SSA).

**E. Performance Metrics**

MTC2 will implement the complementary Integrated Product Controls (IPC) and Agile Metrics to measure progress against the plan with SSC PAC as approved during Milestone B in FY 2018.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3323 / *Maritime Tactical Command & Control (MTC2)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | SSC : San Diego, CA | 9.817 | 0.996 | Dec 2017 | 2.909 | Dec 2018 | 1.006 | Dec 2019 | - | | 1.006 | Continuing | Continuing | Continuing |
| Training Development | WR | SSC : San Diego, CA | 1.940 | 0.000 | | 0.078 | Dec 2018 | 0.058 | Dec 2019 | - | | 0.058 | Continuing | Continuing | Continuing |
| Integration, Assembly & Test | WR | SSC : San Diego, CA | 26.649 | 1.147 | Dec 2017 | 3.009 | Dec 2018 | 0.775 | Dec 2019 | - | | 0.775 | Continuing | Continuing | Continuing |
| Studies & Design | MIPR | Various : Various | 1.764 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.764 | 1.764 |
| Systems Engineering | C/CPFF | Various : Various | 12.287 | 1.066 | Dec 2017 | 1.855 | Dec 2018 | 1.312 | Dec 2019 | - | | 1.312 | Continuing | Continuing | Continuing |
| Software Development | WR | SSC : San Diego, CA | 1.384 | 9.546 | Dec 2017 | 3.139 | Dec 2018 | 4.936 | Dec 2019 | - | | 4.936 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 53.841 | 12.755 | | 10.990 | | 8.087 | | - | | 8.087 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | SSC : Norfolk, VA/ San Diego, CA | 0.135 | 0.063 | Dec 2017 | 0.078 | Dec 2018 | 0.048 | Dec 2019 | - | | 0.048 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | C/CPFF | SeaPort : San Diego, CA | 0.061 | 0.017 | Dec 2017 | 0.148 | Dec 2018 | 0.121 | Dec 2019 | - | | 0.121 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.196 | 0.080 | | 0.226 | | 0.169 | | - | | 0.169 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | SeaPort : San Diego, CA | 4.331 | 0.050 | Dec 2017 | 0.735 | Dec 2018 | 0.403 | Dec 2019 | - | | 0.403 | Continuing | Continuing | Continuing |
| Management Services Prior Year | Various | Various : Various | 1.488 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.488 | - |
| | | **Subtotal** | 5.819 | 0.050 | | 0.735 | | 0.403 | | - | | 0.403 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3323 / *Maritime Tactical Command & Control (MTC2)* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 59.856 | 12.885 | | 11.951 | | 8.659 | | - | | 8.659 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3323 / *Maritime Tactical Command & Control (MTC2)* |

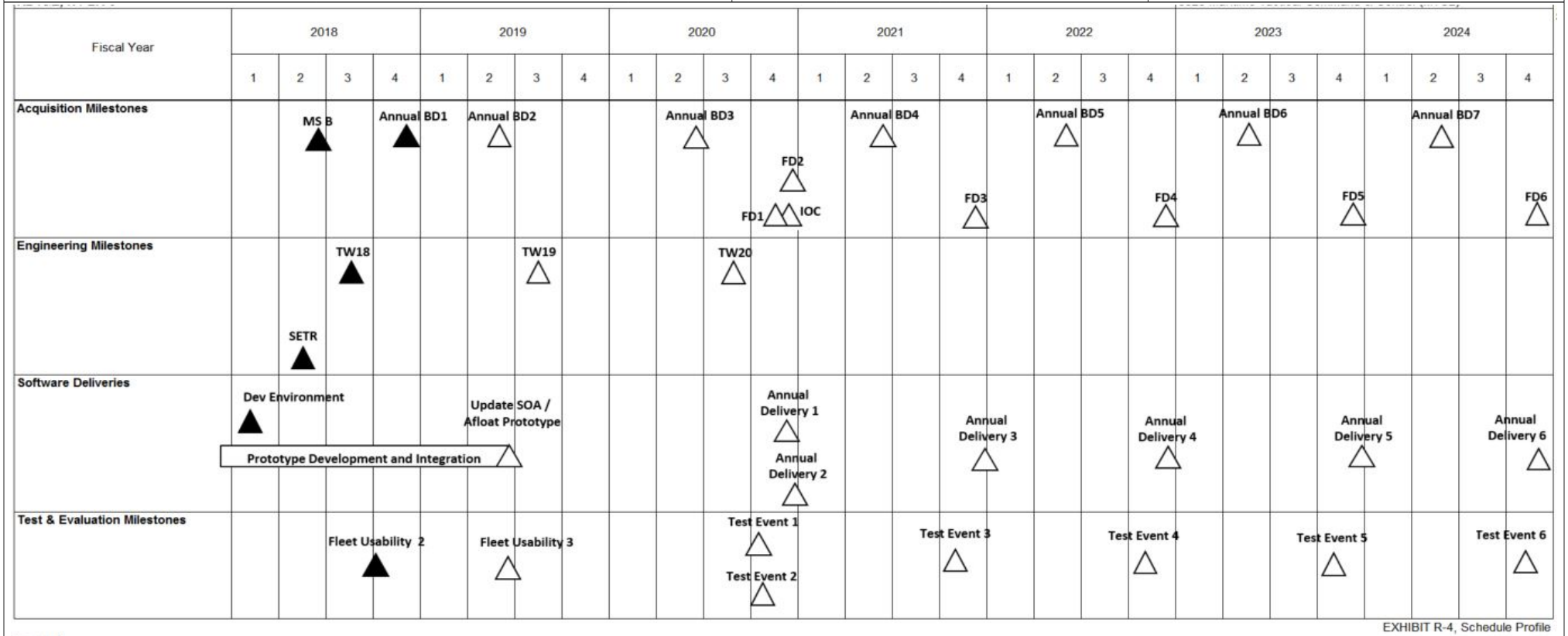



EXHIBIT R-4, Schedule Profile

**Legend:**

BD - Build Decision
Dev - Development
FD - Field Decision
IOC - Initial Operational Capability
MS - Milestone
SETR - Systems Engineering Technical Review
SOA - Service Oriented Architecture
TW - Trident Warrior

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3323 / *Maritime Tactical Command & Control (MTC2)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3323*** | | | | |
| Prototype Development and Integration | 1 | 2018 | 2 | 2019 |
| Development Environment | 1 | 2018 | 1 | 2018 |
| System Engineering Technical Review (SETR) | 2 | 2018 | 2 | 2018 |
| Milestone B | 2 | 2018 | 2 | 2018 |
| Trident Warrior Fiscal Year 2018 (TW) | 3 | 2018 | 3 | 2018 |
| Fleet Usability 2 | 4 | 2018 | 4 | 2018 |
| Annual Build Decision (BD) 1 | 4 | 2018 | 4 | 2018 |
| Annual Build Decision (BD) 2 | 2 | 2019 | 2 | 2019 |
| Update Service Oriented Architecture (SOA) / Afloat Prototype | 2 | 2019 | 2 | 2019 |
| Fleet Usability 3 | 2 | 2019 | 2 | 2019 |
| Trident Warrior Fiscal Year 2019 (TW) | 3 | 2019 | 3 | 2019 |
| Annual Build Decision (BD) 3 | 2 | 2020 | 2 | 2020 |
| Trident Warrior Fiscal Year 2020 (TW) | 3 | 2020 | 3 | 2020 |
| Test Event 1 | 4 | 2020 | 4 | 2020 |
| Test Event 2 | 4 | 2020 | 4 | 2020 |
| Fielding Decision (FD) 1 | 4 | 2020 | 4 | 2020 |
| Annual Delivery 1 | 4 | 2020 | 4 | 2020 |
| Initial Operational Capability (IOC) | 4 | 2020 | 4 | 2020 |
| Fielding Decision (FD) 2 | 4 | 2020 | 4 | 2020 |
| Annual Delivery 2 | 4 | 2020 | 4 | 2020 |
| Annual Build Decision (BD) 4 | 2 | 2021 | 2 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3323 / *Maritime Tactical Command & Control (MTC2)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test Event 3 | 4 | 2021 | 4 | 2021 |
| Fielding Decision (FD) 3 | 4 | 2021 | 4 | 2021 |
| Annual Delivery 3 | 4 | 2021 | 4 | 2021 |
| Annual Build Decision (BD) 5 | 2 | 2022 | 2 | 2022 |
| Test Event 4 | 4 | 2022 | 4 | 2022 |
| Fielding Decision (FD) 4 | 4 | 2022 | 4 | 2022 |
| Annual Delivery 4 | 4 | 2022 | 4 | 2022 |
| Annual Build Decision (BD) 6 | 2 | 2023 | 2 | 2023 |
| Test Event 5 | 4 | 2023 | 4 | 2023 |
| Fielding Decision (FD) 5 | 4 | 2023 | 4 | 2023 |
| Annual Delivery 5 | 4 | 2023 | 4 | 2023 |
| Annual Build Decision (BD) 7 | 2 | 2024 | 2 | 2024 |
| Test Event 6 | 4 | 2024 | 4 | 2024 |
| Annual Delivery 6 | 4 | 2024 | 4 | 2024 |
| Fielding Decision (FD) 6 | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3324 / *Navy Air Operations Command and Control (NAOC2)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3324: *Navy Air Operations Command and Control (NAOC2)* | 14.044 | 0.831 | 1.004 | 0.708 | - | 0.708 | 0.514 | 0.744 | 0.759 | 0.774 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Navy Air Operations Command and Control (NAOC2): NAOC2 integrates and tests Air Force program of record systems that provide an integrated and scalable planning system for standardized, secure, and automated decision support for Air Force, Joint, and Allied commanders worldwide. These programs provide automated air operations planning, execution management and intelligence capabilities at the Force level to include fleet commanders, numbered fleet commanders, Commander Carrier Strike Groups, Commander Expeditionary Strike Groups, Commander Landing Forces, and Joint Task Force Commanders. NAOC2 includes Theater Battle Management Core System (TBMCS) and Command and Control Air Operations Suite - Command and Control Information Services (C2AOS-C2IS). C2AOS-C2IS is comprised of multiple projects incorporated into three Capability Packages (CPs) and will deploy to a Service Oriented Architecture (SOA) enterprise environment that aligns with the Joint C2 Reference Architecture (JC2RA) such as Consolidated Afloat Networks and Enterprise Services (CANES). C2AOS-C2IS is not natively compatible with Navy Information Technology (IT) infrastructure, such as CANES, and requires a significant level of system integration. Continuation of Navy integration and test efforts will significantly enhance the ability of the Joint Force Air Component Commander and Combined Air Operations Center personnel to plan daily air operations including strike, airlift, offensive/defensive air, missile defense, and refueling missions in support of combat operations. Developmental Testing of the C2AOS-C2IS program will be continued for new technology insertion into Navy infrastructure network and hardware in support of Naval Air C2 and Net Enabled Weapons system integration. C2AOS-C2IS addresses the requirement of war fighter distributed planning and execution processes along with significantly improving Joint interoperability. TBMCS continues a hardware transition to CANES. Currently, TBMCS is the key system that is used to conduct real world air planning in the Joint and Navy environments. C2AOS-C2IS will replace TBMCS while bringing more flexibility to the war fighter. In FY 2020, the program will continue Navy CANES integration/ testing for Air Force developed C2AOS-C2IS CPs and Command and Control Software Baseline (C2SB), and support Navy operational test agency execution during multi-service test events.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Command and Control Air and Space Operations Suite - Command and Control Information Services (C2AOS-C2IS) Integration and Testing | 0.831 | 1.004 | 0.708 | 0.000 | 0.708 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct application integration, produce installation documentation, and execute testing of Command and Control Air and Space Operations Suite - Command and Control Information Services (C2AOS-C2IS) Capability Packages (CPs) and Command and Control Software Baseline (C2SB) within a Consolidated Afloat Networks and Enterprise Services (CANES) System Integration Test (SIT) event. Continue Multi-Service Operational Test | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3324 / *Navy Air Operations Command and Control (NAOC2)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and Evaluation (MOT&E) preparatory testing to ensure product compatibility with Navy infrastructure and allow execution of MOT&E. Support operational test agency execution of MOT&E at the Maritime Operations Center (MOC).<br>***FY 2020 Base Plans:***<br>Conduct Operational Testing onboard a U.S. Navy asset to support the joint MOT&E and inform Navy afloat fielding decision, as well as integration and test activities for C2AOS-C2IS in preparation for fielding and Initial Operational Capability in FY 2020. The MOT&E activities include conducting the following Test and Evaluation (T&E) activities: Integration and Developmental Testing of CP1 - CP3 and C2SB in Two (2) Application Integration (AI) SITs, an Operational and Cyber Test in AI SIT 10, and a shipboard Initial Operation Test & Evaluation (IOT&E) and cyber test event. C2AOS-C2IS will commence transition and development of Airspace Management Application/Airspace Information service (ASMA-ASIS) as a Battle Management Aid (BMA), that will deliver performance at the speed of relevance for Command, Control, Communication, Computers, Information, Surveillance, Reconnaissance (C4ISR) and enhance joint lethality in contested environments. Furthermore, it will improve combat readiness with an intuitive user interface. Additionally, C2AOS-C2IS will develop and integrate Global Command and Control System - Joint (GCCS-J) 6.0 baseline to support Modernized Integrated Database (MIDB) capability.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>RDTE funding decrease in FY 2020 due to a reduction in testing efforts and initiation of C2AOS-C2IS simultaneous fielding. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.831 | 1.004 | 0.708 | 0.000 | 0.708 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Theater Battle Management Core System (TBMCS) and Command and Control Air Operations Suite - Command and Control Information Services (C2AOS-C2IS) are designed, developed, and delivered by the Air Force and will be integrated for a Navy Common Computing Environment (CCE) such as Consolidated Afloat Network

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3324 / *Navy Air Operations Command and Control (NAOC2)* |

and Enterprise Services (CANES). As a Joint interest program, this approach satisfies the current validated requirements, supports the accelerated retirement of legacy hardware, and reduces overall risk to the program.

**E. Performance Metrics**

Theater Battle Management Core System (TBMCS) and Command and Control Air Operations Suite - Command and Control Information Services (C2AOS-C2IS) are designed, developed, and delivered by the Air Force. This leverage reduces integration and testing costs associated with each capability module. The solutions will reside on Navy Common Computing Environment (CCE)/Consolidated Afloat Network and Enterprise Services (CANES) architecture. These software-only solutions eliminate hardware procurement, installation, and reduce sustainment costs.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3324 / *Navy Air Operations Command and Control (NAOC2)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering/ Training DevelopmentText/ Configuration Management | WR | SSC Pacific : San Diego, CA | 3.766 | 0.050 | Jan 2018 | 0.083 | Nov 2018 | 0.058 | Nov 2019 | - | | 0.058 | Continuing | Continuing | Continuing |
| Integration and Testing | WR | SSC Pacific : San Diego, CA | 3.122 | 0.764 | Jan 2018 | 0.737 | Nov 2018 | 0.520 | Nov 2019 | - | | 0.520 | Continuing | Continuing | Continuing |
| NAOC2 Product Development | Various | VARIOUS : VARIOUS | 2.512 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.512 | 2.512 |
| | | **Subtotal** | 9.400 | 0.814 | | 0.820 | | 0.578 | | - | | 0.578 | Continuing | Continuing | N/A |

**Remarks**

RDTE product development efforts decrease in FY 2020 due to a reduction in testing efforts and initiation of C2AOS-C2IS simultaneous fielding.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development/ILS Support | WR | VARIOUS : VARIOUS | 0.538 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.538 | 0.538 |
| | | **Subtotal** | 0.538 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.538 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test & Evaluation | MIPR | COMOPTEVFOR : Norfolk, VA | 0.387 | 0.017 | Dec 2017 | 0.184 | Nov 2018 | 0.130 | Nov 2019 | - | | 0.130 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | SSC Pacific : San Diego, CA | 2.651 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.651 | 2.340 |
| | | **Subtotal** | 3.038 | 0.017 | | 0.184 | | 0.130 | | - | | 0.130 | Continuing | Continuing | N/A |

**Remarks**

FY 2020 RDTE test and evaluation efforts to support Multi-Service Operational Test & Evaluation (MOT&E) (OT Phase 2).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>3324 / *Navy Air Operations Command and Control (NAOC2)* | |

**Management Services ($ in Millions)**

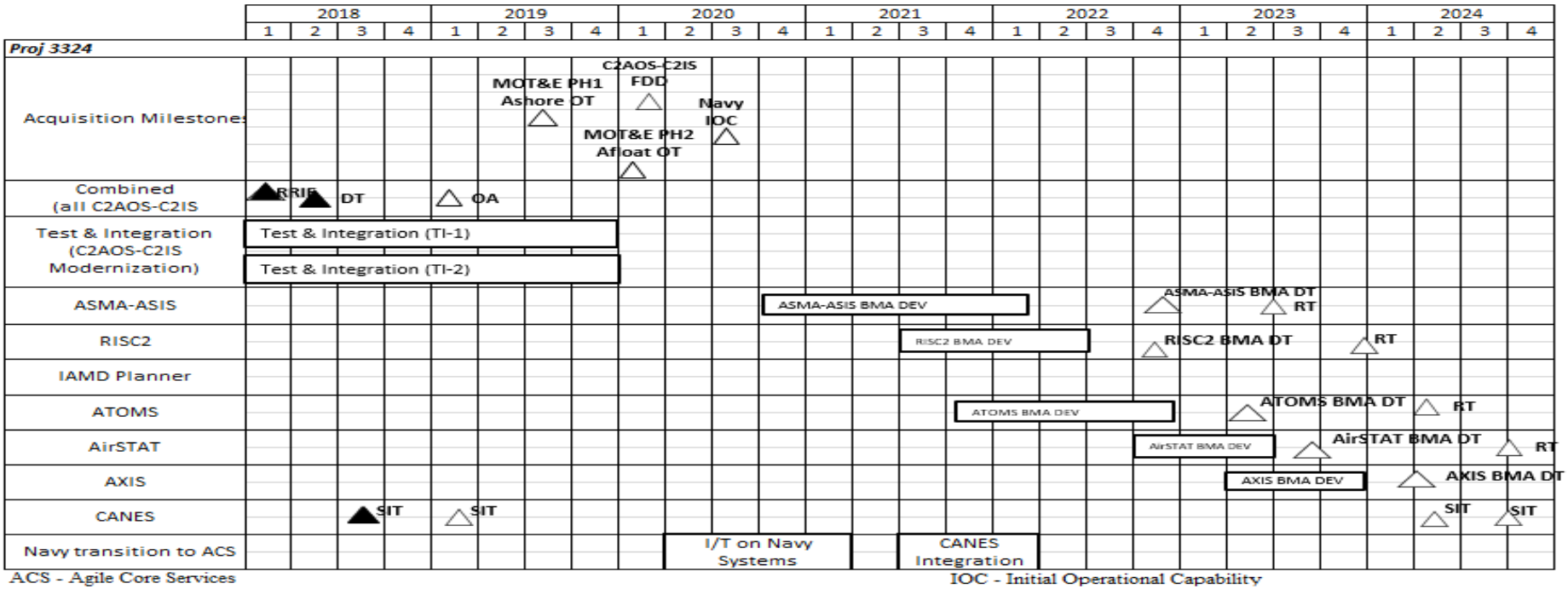
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering and Program Management Support | C/CPFF | Various : San Diego, CA | 1.068 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.068 | 1.068 |
| | | **Subtotal** | 1.068 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.068 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 14.044 | 0.831 | | 1.004 | | 0.708 | | - | | 0.708 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3324 / *Navy Air Operations Command and Control (NAOC2)* |

| Exhibit R-4, RDT&E Schedule Profile: BES 2020 Navy | | Date: August 2018 |
|---|---|---|
| **Appropriation/Budget**<br>1319 / 05 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3324 / *Navy Air Operations Command and Control (NAOC2)* |




ACS - Agile Core Services
AirSTAT - Air Status *[CP-1 project]*
ASMA-ASIS - Airspace Management Application/Airspace Information service *[CP-2 project]*
ATOMS - Air Tasking Order Management System *[CP-1 project]*
AXIS - Air Execution Information System *[CP-3 project]*
BMA - Battle Management Aid
C2AOS-C2IS - Command and Control Air Operations Suite - Command and Control Information Services
CANES - Consolidated Afloat Network and Enterprise Services
CP - Capability Package
DEV - Development
DT - Developmental Test
FDD - Full Deployment Decision
IOC - Initial Operational Capability
I/T - Integration and Testing
IAMD - Integrated Air and Missile Defense *[CP-2 project]*
MOT&E - Multi-Service Operational Test & Evaluation
OA - Operational Assessment
OT - Operational Test
PH - Phase
RISC2 - Request Information Services for Command and Control *[CP-1 project]*
RRIE - Risk Reduction Integration Event
RT - Regression Test
SIT - System Integration Test
TI - Test and Integration

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3324 / *Navy Air Operations Command and Control (NAOC2)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3324*** | | | | |
| Combined Command and Control Air Operations Suite - Command and Control Information Services (C2AOS-C2IS) Risk Reduction Integration Event (RRIE) | 1 | 2018 | 1 | 2018 |
| C2AOS-C2IS Modernization Test & Integration (TI-1) | 1 | 2018 | 4 | 2019 |
| C2AOS-C2IS Modernization Test & Integration (TI-2) | 1 | 2018 | 4 | 2019 |
| Combined C2AOS-C2IS Developmental Test (DT) | 2 | 2018 | 2 | 2018 |
| Consolidated Afloat Network and Enterprise Services (CANES) System Integration Test (SIT) FY 2018 | 3 | 2018 | 3 | 2018 |
| CANES SIT FY 2019 | 1 | 2019 | 1 | 2019 |
| Operational Assessment (OA) | 1 | 2019 | 1 | 2019 |
| Multi-Service Operational Test & Evaluation (MOT&E) (OT Phase 1) | 3 | 2019 | 3 | 2019 |
| MOT&E (OT Phase 2) | 1 | 2020 | 1 | 2020 |
| C2AOS-C2IS Full Deployment Decision (FDD) | 1 | 2020 | 1 | 2020 |
| Integration and Testing (I/T) on Navy Systems | 2 | 2020 | 1 | 2021 |
| Navy Initial Operational Capability (IOC) | 3 | 2020 | 3 | 2020 |
| Airspace Management Application/Airspace Information service (ASMA-ASIS) Battle Management Aid (BMA) Development (Dev) | 4 | 2020 | 1 | 2022 |
| Request Information Services for Command and Control (RISC2) BMA Dev | 3 | 2021 | 2 | 2022 |
| CANES Integration | 3 | 2021 | 1 | 2022 |
| Air Tasking Order Management System (ATOMS) BMA Dev | 4 | 2021 | 4 | 2022 |
| ASMA-ASIS BMA DT | 4 | 2022 | 4 | 2022 |
| RISC2 BMA DT | 4 | 2022 | 4 | 2022 |
| Air Status (AirSTAT) BMA Dev | 4 | 2022 | 2 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>3324 / *Navy Air Operations Command and Control (NAOC2)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| AXIS BMA Dev | 2 | 2023 | 4 | 2023 |
| ASMA-ASIS Regression Test (RT) | 2 | 2023 | 3 | 2023 |
| ATOMS BMA DT | 2 | 2023 | 2 | 2023 |
| AirSTAT BMA DT | 3 | 2023 | 4 | 2023 |
| RISC2 RT | 4 | 2023 | 1 | 2024 |
| AXIS BMA DT | 1 | 2024 | 2 | 2024 |
| ATOMS RT | 2 | 2024 | 2 | 2024 |
| CANES SIT FY 2024 (I) | 2 | 2024 | 2 | 2024 |
| AirSTAT RT | 3 | 2024 | 4 | 2024 |
| CANES SIT FY 2024 (II) | 3 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | | | | Project (Number/Name)<br>9123 / *FORCEnet* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 9123: *FORCEnet* | 239.828 | 2.002 | 2.209 | 2.179 | - | 2.179 | 2.221 | 2.268 | 2.312 | 2.359 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

FORCEnet is the Navy and Marine Corps initiative to deliver Information Warfare (IW) and achieve Department of the Navy (DoN)/Department of Defense (DoD) Transformation, Joint/Allied/Coalition Interoperability, implementing Maritime Domain Awareness (MDA), and Net-Centric Operations/Warfare (NCO/W). Chief of Naval Operations (CNO) IW effort focuses prioritization and organizational responsibility for IW, cyber, intelligence and sensors resulting in increased scope of systems, platforms and mission areas. FORCEnet is a foundation of Sea Power 21, Naval Power 21, which is the Naval Operating Concept (NOC) for Joint Operations, and the DoN's Naval Transformation Roadmap.

Funding supports IW Portfolio Health Assessments (PHAs) of Navy mission areas and identifies gaps in IW capabilities in the context of assessed mission areas. Funds support vignettes, technical baselines, architecture products, and briefings developed to support sponsor decision making processes.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** FORCEnet | 2.002 | 2.209 | 2.179 | 0.000 | 2.179 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Continue to expand upon SoS mission engineering analyses and ongoing experimentation to iteratively mature the findings and outcomes, while increasing the support to a development of a Limited Operational Capability.<br>-Continue to utilize and study Navy mission areas in support of System of Systems (SoS) engineering assessments identifying integration and interoperability gaps, trades, and solutions for sponsor related equities.<br>-Continue to identify Navy mission area gaps in Information Warfare (IW) capabilities to prioritize Science and Technology (S&T) efforts for future budget decisions. Continue to identify critical architectural dependencies that enable mission situational awareness, which is a key component of the Portfolio Health Assessments (PHAs).<br>-Continue to assess tradespace and solutions, ensuring Force level capability and SoS integration and interoperability in studied mission areas.<br>-Continue to package assessments to support sponsor decision-making processes. | | | | | |
| ***FY 2020 Base Plans:***<br>-Continue to expand upon SoS mission engineering analyses and ongoing experimentation to iteratively mature the findings and outcomes, while increasing the support to a development of a Limited Operational Capability.<br>-Continue to utilize and study Navy mission areas in support of System of Systems (SoS) engineering assessments identifying integration and interoperability gaps, trades, and solutions for sponsor related equities. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>9123 / *FORCEnet* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue to identify Navy mission area gaps in Information Warfare (IW) capabilities to prioritize Science and Technology (S&T) efforts for future budget decisions. Continue to identify critical architectural dependencies that enable mission situational awareness, which is a key component of the Portfolio Health Assessments (PHAs).<br>-Continue to assess tradespace and solutions, ensuring Force level capability and SoS integration and interoperability in studied mission areas.<br>-Continue to package assessments to support sponsor decision-making processes.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $30K decrease to FORCEnet is attributed to efficiencies identified while assessing Information Warfare capability/Science and Technology gaps in the context of assessed mission areas. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.002 | 2.209 | 2.179 | 0.000 | 2.179 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

FORCEnet is a non-acquisition effort that informs and matures Navy decisions, which in turn impacts acquisition programs. Activities include acquiring intellectual capital in emerging technical areas through contracts providing technical engineering expertise and surge capacity for emerging tasks.

**E. Performance Metrics**

Goal: Chief of Naval Operations (CNO) strategic planning and supporting acquisition of classified efforts.
Metric: Echelon I response to emergent strategic needs and classified warfighting capability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>9123 / *FORCEnet* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development and Systems Engineering | Various | Various : Various | 4.331 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.331 | - |
| | | **Subtotal** | 4.331 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.331 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development and Logistics Support | Various | Various : Various | 136.842 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 136.842 | - |
| Information Warfare Roadmaps and Analysis | C/CPFF | SAIC : McLean, VA | 10.695 | 1.504 | Mar 2018 | 1.712 | Mar 2019 | 1.677 | Mar 2020 | - | | 1.677 | Continuing | Continuing | Continuing |
| Information Warfare Roadmaps and Analysis | WR | SSC LANT : Charleston, NC | 2.545 | 0.309 | Mar 2018 | 0.497 | Mar 2019 | 0.502 | Mar 2020 | - | | 0.502 | Continuing | Continuing | Continuing |
| Information Warfare Roadmaps and Analysis | C/CPFF | BAH : McLean, VA | 0.462 | 0.189 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.651 | - |
| | | **Subtotal** | 150.544 | 2.002 | | 2.209 | | 2.179 | | - | | 2.179 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Accelerating Joint Warfighting Capability | Various | Various : Various | 77.271 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 77.271 | - |
| | | **Subtotal** | 77.271 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 77.271 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering and Technical Support | Various | Various : Various | 7.682 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.682 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604231N / *Tactical Command System* | Project (Number/Name)<br>9123 / *FORCEnet* | |

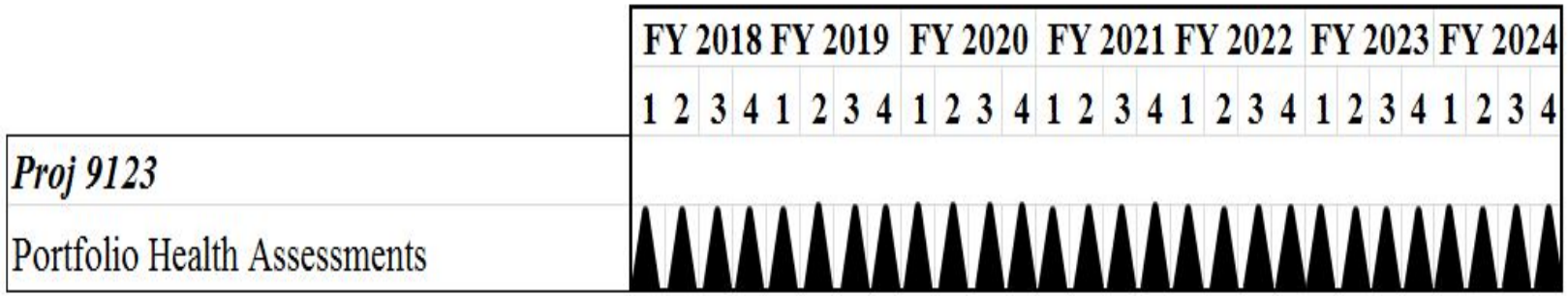
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Subtotal** | | | 7.682 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.682 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 239.828 | 2.002 | | 2.209 | | 2.179 | | - | | 2.179 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>9123 / *FORCEnet* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604231N / *Tactical Command System* | **Project (Number/Name)**<br>9123 / *FORCEnet* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9123*** | | | | |
| Naval Information Warfare Enterprise | 1 | 2018 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604234N *I Advanced Hawkeye* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 4,942.431 | 283.497 | 210.565 | 232.752 | - | 232.752 | 258.869 | 355.168 | 421.001 | 397.643 | 0.000 | 7,101.926 |
| 3051: *E-2D Adv Hawkeye* | 4,924.552 | 273.840 | 198.565 | 232.752 | - | 232.752 | 258.869 | 355.168 | 421.001 | 397.643 | 0.000 | 7,062.390 |
| 9999: *Congressional Adds* | 17.879 | 9.657 | 12.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 39.536 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 364 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The E-2D Advanced Hawkeye (AHE) program develops, demonstrates, tests, and procures the replacement of the AN/APS-145 radar system and other aircraft system components including Cooperative Engagement Capability Pre-Planned Product Improvement and Dual Transmit Satellite Communications that improve the E-2 weapon system to maintain open ocean mission capability while providing the United States Navy with an effective littoral surveillance, battle management, Naval Integrated Fire Control (NIFC) and Theater Air and Missile Defense (TAMD) capability. Key radar technologies are Space-Time Adaptive Processing, Electronically Scanning Array, solid state transmitter, high dynamic range digital receivers and Identification Friend or Foe (IFF)/radar aperture integration. The resultant detection system provides a substantially improved overland performance by correcting current sensor shortfalls and enhancing all current required mission areas, while simultaneously contributing to the emerging TAMD mission requirements. Mode 5 is an upgrade to the existing IFF System providing the warfighter positive, secure and reliable identification of friendly aircraft, surface and sub-surface platforms. Mode 5 replaces the National Security Administration de-certified Mode 4 IFF capability, which is no longer effective or suitable for modern military operations. Mode 5 will support the Joint Initial Operational Capability (IOC) as defined by the Joint Requirements Oversight Council.

The Navy declared IOC for the E-2D in October 2014 with the first operational deployment in FY15. The System Development and Demonstration contract completed in FY15 as the program transitions into the production, deployment, and sustainment phase. Throughout the development of the E-2D, the threat has continued to evolve increasing in both capability and capacity. The E-2D Research, Development, Test and Evaluation budget after IOC reflects the Navy's further investment into the E-2D to ensure that carrier based command and control continues to pace the FY2020 and beyond threat in support of Navy and Joint operations around the world.

The program will be aligning the capability development in areas where there are interwoven technologies that leverage each other to provide the most efficient and cost effective means of delivering these capabilities to the warfighters. The program will deliver these capabilities to the Fleet users on approximately a 24 month release cycle as part of combined Delta System/Software Configuration (DSSC) builds. The baseline IOC configuration is named DSSC build 1 (DSSC-1). The DSSC build schedule is outlined along with the capabilities that are planned to comprise each DSSC build. If a capability is delayed or accelerated it will move between DSSC builds which will be reflected in updates to this budget.

DSSC-2 Fleet released in August FY16. DSSC-2 incorporates several technologies developed under the System Development and Demonstration phase which include Dual Transmit Satellite Communications and an IFF technology refresh in preparation for Mode 5 and Mode S.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604234N *I Advanced Hawkeye* |

DSSC-2.1 incorporates IFF Mode 5 capability early release to operational squadrons ahead of formal DSSC-3 release.

DSSC-3 is planned for operational test and Fleet release in FY19. DSSC-3 is comprised of the following capabilities:
E-2D Accelerated Mid-Term Interoperability Improvement Program, NIFC Increment 2 and Automatic Identification System, Embedded National Tactical Receiver.
DSSC-3AR is planned for operational test and Fleet release in FY19. DSSC-3AR is comprised of all capabilities listed in DSSC-3 plus Aerial Refueling.

DSSC-3.1 is planned for Developmental Test (DT)Assist and Fleet release in FY20. DSSC-3.1 is comprised of the following capabilities: Crypto Modernization/ Frequency Remapping (CM/FR), Hybrid-Beyond Line of Sight(H-BLOS)SIPRChat, and E-2D Navigation Warfare.

DSSC-4 is planned for operational test in FY21 and Fleet release in FY22. DSSC-4 provides critical capabilities needed to pace the 2020 threat and enabling components of NIFC increment 3. DSSC-4 is comprised of the following capabilities: E-2D Multifunctional Information Distribution System/Joint Tactical Radio System, Tactical Targeting Networking Technology, Secret Internet Protocol Router Chat, Data Fusion (phase 1), Sensor Netting, and DSSC-4 Counter Electronic Attack.

DSSC-5 is planned for operational test and Fleet release in FY24. DSSC-5 provides the capabilities necessary for E-2D to meet NIFC increment 3 requirements and is comprised of the following: Sensor Netting, Stores Performance Assessment Requested Quality, Data Fusion (Phase 2), E-2D AN/ALQ-217 Electronic Support Measures and DSSC-5 Counter Electronic Attack.

DSSC-6 is planned for operational test and Fleet release in FY26. DSSC-6 provides the capabilities necessary for E-2D to meet NIFC increment 3 requirements and is comprised of the following: Theater Combat ID, Survivability and DSSC-6 Counter Electronic Attack.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 292.535 | 223.565 | 225.063 | - | 225.063 |
| Current President's Budget | 283.497 | 210.565 | 232.752 | - | 232.752 |
| Total Adjustments | -9.038 | -13.000 | 7.689 | - | 7.689 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -25.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 12.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -3.778 | 0.000 | | | |
| • SBIR/STTR Transfer | -7.760 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 9.838 | - | 9.838 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -2.149 | - | -2.149 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604234N *I Advanced Hawkeye* | | | |
| • Congressional Directed Reductions | -7.500 | - | - | - | - |
| Adjustments | | | | | |
| • Congressional Add Adjustments | 10.000 | - | - | - | - |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Radar Enhancements* | 9.657 | 0.000 |
| Congressional Add: *E-2D Hawkeye Advanced Radar* | 0.000 | 12.000 |
| Congressional Add Subtotals for Project: 9999 | 9.657 | 12.000 |
| Congressional Add Totals for all Projects | 9.657 | 12.000 |

**Change Summary Explanation**

Technical: N/A

Schedule:
1. Updated Advanced Hawkeye schedule for the Test and Evaluation to incorporate DSSC-3.1 for the DSSC builds.
2. Updated Counter Electronic Attack (CEA) schedule to reflect how capability will be delivered based on the DSSC build schedules and required technical maturity level.
3. Updated Data Fusion schedules to incorporate development of required technical maturity level.
4. Updated Sensor Netting to show capability will be included in DSSC-5.
5. Revised ALQ217 Electronic Support Measures Upgrade schedule to reflect June 2018 contract award. Incorporated survivability requirements.
6. Added Theater Combat Identification (CID)schedule in DSSC-6.
7. Deleted Fighter to Fighter schedule since capability intertwined with Data Fusion. Data Fusion schedule includes Fighter to Fighter (consolidated Data Fusion & Fighter to Fighter into one capability).

Decrease in FY 2020 funding request was reduced by $20.0 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
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| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>3051 / *E-2D Adv Hawkeye* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3051: *E-2D Adv Hawkeye* | 4,924.552 | 273.840 | 198.565 | 232.752 | - | 232.752 | 258.869 | 355.168 | 421.001 | 397.643 | 0.000 | 7,062.390 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 364

**A. Mission Description and Budget Item Justification**

The E-2D Advanced Hawkeye (AHE) program develops, demonstrates, tests, and procures the replacement of the AN/APS-145 radar system and other aircraft system components including Cooperative Engagement Capability Pre-Planned Product Improvement and Dual Transmit Satellite Communications that improve the E-2 weapon system to maintain open ocean mission capability while providing the United States Navy with an effective littoral surveillance, battle management, Naval Integrated Fire Control (NIFC) and Theater Air and Missile Defense (TAMD) capability. Key radar technologies are Space-Time Adaptive Processing, Electronically Scanning Array, solid state transmitter, high dynamic range digital receivers and Identification Friend or Foe (IFF)/radar aperture integration. The resultant detection system provides a substantially improved overland performance by correcting current sensor shortfalls and enhancing all current required mission areas, while simultaneously contributing to the emerging TAMD mission requirements. Mode 5 is an upgrade to the existing IFF System providing the warfighter positive, secure and reliable identification of friendly aircraft, surface and sub-surface platforms. Mode 5 replaces the National Security Administration de-certified Mode 4 IFF capability, which is no longer effective or suitable for modern military operations. Mode 5 will support the Joint Initial Operational (IOC) as defined by the Joint Requirements Oversight Council.

The Navy declared IOC for the E-2D in October 2014 with the first operational deployment in FY15. The System Development and Demonstration contract completed in FY15 as the program transitions into the production, deployment, and sustainment phase. Throughout the development of the E-2D, the threat has continued to evolve increasing in both capability and capacity. The E-2D Research, Development, Test and Evaluation budget after IOC reflects the Navy's further investment into the E-2D to ensure that carrier based command and control continues to pace the 2020 and beyond threat in support of Navy and Joint operations around the world.

The program will be aligning the capability development in areas where there are interwoven technologies that leverage each other to provide the most efficient and cost effective means of delivering these capabilities to the warfighters. The program will deliver these capabilities to the Fleet users on an approximately 24 month release cycle as part of combined Delta System/Software Configuration (DSSC) builds. The baseline IOC configuration is named DSSC build 1 (DSSC-1). The DSSC build schedule is outlined below along with the capabilities that are planned to comprise each DSSC build. If a capability is delayed or accelerated it will move between DSSC builds which will be reflected in updates to this budget.

DSSC-2 Fleet released in August FY16. DSSC-2 incorporates several technologies developed under the System Development and Demonstration phase which include Dual Transmit Satellite Communications and an IFF technology refresh in preparation for Mode 5 and Mode S.

DSSC-2.1 incorporates IFF Mode 5 capability early release to operational squadrons ahead of formal DSSC-3 release.

DSSC-3 is planned for operational test and Fleet release in FY19. DSSC-3 is comprised of the following capabilities:

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1. The E-2D Accelerated Mid-Term Interoperability Improvement Program (AMIIP) will address the most severe Cooperative Engagement Capability and data link related interoperability issues. This capability will significantly improve the quality of the tactical surveillance picture across all participants, reduce the possibility of track mis-identification and mitigate Blue on Blue engagements. AMIIP provides stable sensor fusion foundation to support sensor/weapon coordination requirements.

2. NIFC enhancements will incorporate weapon system software improvements to implement capabilities and performance improvements needed to meet NIFC increment 2 requirements. These capabilities come from software development in both the E-2D Classified and NIFC Enhancement and Testing lines.

DSSC-3AR is planned for operational test and Fleet release in FY19. DSSC-3AR is comprised of all capabilities listed in DSSC-3 plus Aerial Refueling (AR).

1. An AR capability will allow the E-2D AHE to receive fuel from various organic and non-organic tanker aircraft. It provides Expanded Battle Space Surveillance and Targeting through significantly enhanced persistence and increased flexibility (range & endurance). AR will better enable the E-2D AHE to fully support current Carrier Strike Group /Joint 24/7 Theater Operations by providing more versatile stationing and/or forward basing options. Previous domestic E-2 concept demonstration effort successfully established the feasibility of tanking behind the F/A-18E/F and KC-130 aircraft under E-2 Squadrons, PE 0204152N.

DSSC-3.1 is planned for Developmental Test (DT)Assist and Fleet release in FY20. DSSC-3.1 is comprised of the following capabilities:

1. Crypto Modernization/Frequency Remapping: The E-2D Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS) with concurrent Multi-netting will be integrated into the E-2D. This effort includes replacing the Multifunctional Information Distribution System-Low Volume Terminal (MIDS LVT) radio with MIDS/JTRS that has incorporated Link-16 concurrent Multi-netting (CMN-4) and replacing the JTIDS High Power Amplifier Group with a Link-16 High Power Amplifier which will address Crypto Modernization and Frequency Remapping.

2. Hybrid-Beyond Line of Sight(H-BLOS)SIPRChat will provide a Secret Internet Protocol Router Network (SIPRNet)Chat capability via INMARSAT.

3. E-2D Navigation Warfare (NAVWAR) prevents loss of Global Positioning System (GPS) by using a Controlled Reception Pattern Antenna (CRPA) and antenna electronics (AE) unit which will function to provide GPS access in an Electronic Attack (EA) environment. NAVWAR significantly reduces the likelihood of loss of critical GPS Position, Navigation and Timing functionality that is fundamental to E-2D battlespace awareness and its contributions to multiple link networks.

DSSC-4 is planned for operational test in FY21 and Fleet release in FY22. DSSC-4 provides critical capabilities needed to pace the 2020 threat and enabling components of NIFC increment 3. DSSC-4 is comprised of the following capabilities:

1. The E-2D Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS)Tactical Targeting Networking Technology (TTNT) integrates Advanced Tactical Data Link functionality into the E-2D. This effort includes replacing the MIDS LVT radio with MIDS/JTRS that has incorporated Link-16 Concurrent Multi-Netting and TTNT. MIDS/JTRS TTNT is a key enabler for E-2D sensor netting capability in support of the NIFC mission.

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

2. The fully integrated E-2D Secret Internet Protocol Router Chat capability will support integration of current collaboration tools including tactical "chat" (text) communications, real-time tasking, and Air Tasking Order distribution. Recent real world operations have demonstrated a migration of Command and Control communications from voice to Internet protocol based networks.

3. E-2D Data Fusion Phase 1 provides a fusion engine to blend all on-board sensor derived track data (e.g. Electronic Surveillance) with already blended radar, Identify Friend or Foe and Cooperative Engagement Capability track files, enhancing situational awareness and tactical decision making. Successful E-2D NIFC engagements depend on a clear/unambiguous tactical picture and the shortest possible decision pipeline.

4. The E-2D DSSC-4 Counter Electronic Attack (CEA) capability will allow the E-2D radar system to maintain performance in an advanced hostile intentional electromagnetic interference environment. The E-2D CEA program will ensure continuous E-2D effectiveness is maintained in an Electronic Attack environment supporting the NIFC capability and overall Navy and Joint Integrated Air and Missile Defense strategy.

5. E-2D Sensor Netting provides fusion of data from off-board sources via a high bandwidth network that will allow E-2D to support the second spiral of performance improvement for NIFC capability. Additional details are classified.

DSSC-5 is planned for operational test in FY23 and Fleet release in FY24. DSSC-5 provides the capabilities necessary for E-2D to meet NIFC increment 3 requirements and is comprised of the following capabilities:

1. E-2D Sensor Netting provides fusion of data from off-board sources via a high bandwidth network that will allow E-2D to support the second spiral of performance improvement for NIFC capability. Additional details are classified.

2. E-2D Stores Performance Assessment Requested Quality (SPARQ) establishes real-time requirements for E-2D sensor contribution to system of system NIFC solutions. SPARQ expands and optimizes operational employment envelopes, improving Air Wing ability to take advantage of System of System capabilities of NIFC, reducing kill chain timelines.

3. E-2D Data Fusion Phase 2 provides a fusion engine to blend all off-board tactical data (e.g. Satellite Receiver System data, Fighter to Fighter backlink data) with already fused on-board tracks from the E-2D Data Fusion Phase 1 effort. Completing the Data Fusion of all track sources available to E-2D greatly enhances situational awareness and tactical decision making. Integrating Link-16 Network Participation Group 20 messages improves interoperability between E-2D and participating US Navy fighters, including 5th generation aircraft. This enhances the combat effectiveness of the E-2D, increases situational awareness and shortens kill-chain timeliness (including NIFC).

4. E-2D AN/ALQ-217 Electronic Support Measures (ESM) Combat Identification (CID) upgrades integrates digital receiver and processing technology, enables E-2 multi-ship geo-location and Time Difference Of Arrival with other sensors across L-16 and Tactical Targeting Networking Technology (TTNT), and provides a precision internal clock source to enable netted detection of advanced threat radar systems. Connectivity to Electronic Warfare (EW) netted sensors will provide multiple nodes, real time, enhanced CID capabilities.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

5. The E-2D DSSC-5 Counter Electronic Attack (CEA) capability will allow the E-2D radar system to maintain performance in an advanced hostile intentional electromagnetic interference environment. The E-2D CEA program will ensure continuous E-2D effectiveness is maintained in an Electronic Attack environment supporting the NIFC capability and overall Navy and Joint Integrated Air and Missile Defense strategy.

DSSC-6 is planned for operational test and Fleet Release in FY26. DSSC-6 provides the capabilities necessary for E-2D to meet NIFC increment 3 requirements and is comprised of the following capabilities:

1. E-2D Theater Combat Identification (CID) including Mission Computer Display Rearchitecture enables the E-2D to distribute Combat Identification (CID) data to the Carrier Strike Group (CSG). E-2D will receive National Technical Means (NTM) and tactical CID data at all security levels and filter/distribute at the highest possible security levels to the tactical edge. Using the Open Mission Systems (OMS) design, the new mission computer architecture will provide multi-level security and cyber hardening provisions to support current and planned capabilities. The OMS design will allow faster integration of these capabilities required to pace the evolving threat.

2. The E-2D DSSC 6 Counter Electronic Attack (CEA) capability will allow the E-2D radar system to maintain performance in an advanced hostile intentional electromagnetic interference environment. The E-2D CEA program will ensure continuous E-2D effectiveness is maintained in an Electronic Attack environment supporting the NIFC capability and overall Navy and Joint Integrated Air and Missile Defense strategy.

3. E-2D Survivability develops additional capabilities for the ALQ-217 ESM. It enables Integrated Fire Control (IFC) in a Highly Contested (HC) environment. This capability will ensure the E-2D can perform its intended mission at locations required to support Naval and Joint force operations.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Full Scale Fatigue Test | 17.502 | 9.879 | 10.318 | 0.000 | 10.318 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Full Scale Fatigue Test efforts for the E-2D Advanced Hawkeye Program. The USN requires that a fatigue test be conducted on the E-2D aircraft to determine the design service life of the airframe. Durability testing is being performed on a test article that is representative of production aircraft. The objective of the 20,000 equivalent flight hours fatigue test is to identify fatigue critical locations, substantiate the 10,000 flight hours service life for the E-2D airframe fuselage and horizontal stabilizer, and demonstrate that the E-2D aircraft structure satisfies the program service life requirement. | | | | | |
| ***FY 2019 Plans:***<br>Funds provided for continued support of Full Scale Fatigue Tests. The test program will continue towards the final goal of 20,000 test hours. Inspections and analysis will be performed at 500 effective flight hour intervals. | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Effort to configure and instrument replacement Outer Wing Panels will continue at the 10,000 hour interval. Repairs of the test article will be conducted as required.<br>***FY 2020 Base Plans:***<br>Funds provided for continued support of Full Scale Fatigue Tests. The test program will continue towards the final goal of 20,000 test hours. Inspections and analysis will be performed at 500 effective flight hour intervals. Repairs of the test article will be conducted as required.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** Delta System/Software Configuration (DSSC) Integration, Test and Cyber Program Protection<br>***Articles:***<br>***Description:*** Funds integration, engineering risk reduction efforts, developmental and operational test of E-2D. Develops cyber hardening, reaction and restoration defensive capabilities to increase E-2D resiliency in a cyber-warfare contested environment. Perform scans and Security Technical Implementation Guidance (STIGS) to identify vulnerabilities, develop mitigations, and comply with Risk Management Framework (RFM) to achieve and maintain a CyberSAFE certification and an Authority to Operate.<br>***FY 2019 Plans:***<br>Funding provided for DSSC 3 Operational Test and fleet release.<br>***FY 2020 Base Plans:***<br>Funding provided to continue engineering risk reduction efforts, conduct DSSC-4 software merge and Aerial Refueling envelope expansion test. Incorporate E-2D Cyber warfare program protection needed to pace the 2020 threat for critical capabilities in support of DSSC builds.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase from FY19 to FY20 due to incorporation of cyber program protection for E-2D. | 15.266<br>- | 15.098<br>- | 34.354<br>- | 0.000<br>- | 34.354<br>- |
| ***Title:*** Aerial Refueling<br>***Articles:*** | 57.961<br>- | 18.910<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Funds the system development and testing to support the incorporation of Aerial Refueling (AR) capability into the E-2D AHE aircraft. Emphasis during system development is on system redesign, air vehicle design, human systems integration and design, including interior/lighting modifications and seat replacement. Flight testing is required to evaluate fuel systems changes, aerial refueling capability, field of view, thermal and aerodynamic loads, kinematic performance, and handling qualities. Planned for DSSC-3AR<br><br>***FY 2019 Plans:***<br>Funding provided for operational test readiness review.<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No Funding requested in FY20. | | | | | |
| ***Title:*** E-2D Counter Electronic Attack (CEA) | 22.214 | 20.401 | 24.200 | 0.000 | 24.200 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funds the mission system development and testing of the capability to counter advanced radar electronic attack threats. The E&MD effort will focus on integration of capabilities in the radar and mission computer display systems that include system integration, and laboratory and flight test validation. Planned for DSSC-4, 5 and 6.<br><br>***FY 2019 Plans:***<br>Program will begin requirements development for DSSC-5 Counter Electronic Attack, Conduct Functional Readiness Review and Execute Developmental Test for DSSC-4 Counter Electronic Attack.<br><br>***FY 2020 Base Plans:***<br>Funds provided for continuation of DSSC-5 Counter Electronic Attack requirements development. Conduct delta functional readiness review, System Readiness Review and begin Hardware/Software development for DSSC-5 Counter Electronic Attack.<br><br>***FY 2020 OCO Plans:*** | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase from FY19 to FY20 due to beginning of hardware/software development. | | | | | |
| ***Title:*** Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS)Tactical Targeting Networking Technology (TTNT)<br>***Articles:***<br><br>***Description:*** MIDS/JTRS TTNT provides Advanced Tactical Data Link functionality into the E-2D. This effort includes replacing the Multifunctional Information Distribution System - Low Volume Terminal (MIDS LVT) radio with MIDS/JTRS that has incorporated Link-16 concurrent Multi-netting (CMN-4) and TTNT. MIDS/JTRS TTNT is a key enabler for E-2D sensor netting capability in support of the Naval Integrated Fire Control-Counter Air mission. Planned for DSSC-4.<br><br>***FY 2019 Plans:***<br>Funds provided to conduct TTNT integration test readiness review.<br><br>***FY 2020 Base Plans:***<br>Funds provided for test readiness review and functional readiness review. Begin developmental test.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decreases from FY19 to FY20 due to current program plan. | 11.539<br>- | 9.781<br>- | 3.061<br>- | 0.000<br>- | 3.061<br>- |
| ***Title:*** SIPR Chat<br>***Articles:***<br><br>***Description:*** The E-2D Secret Internet Protocol Router (SIPR) Chat capability will support integration of current collaboration tools including tactical "chat" (text) communications, real-time tasking, and Air Tasking Order distribution. Recent real world operations have demonstrated a migration of Command and Control communications from voice to Internet protocol based networks. A Hybrid Beyond Line of Sight solution that utilizes the same hardware configuration as DSSC-4 has been identified that provides the SIPRChat capability to the fleet beginning in FY20 (DSSC-3.1). The fully integrated SIPRChat solution will field in DSSC-4 beginning FY22.<br><br>***FY 2019 Plans:*** | 5.279<br>- | 2.782<br>- | 2.837<br>- | 0.000<br>- | 2.837<br>- |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Funds provided for continued System Development & Design. Conduct Test Readiness Review to support and enable SIPRChat capability.<br>***FY 2020 Base Plans:***<br>Funds provided to conduct Functional Readiness Review and Begin development test. Conduct developmental test assist for DSSC-3.1 H-BLOS SIPRchat solution.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** Naval Integrated Fire Control (NIFC)<br>***Articles:***<br>***Description:*** NIFC requires System of Systems level testing. Assesses and addresses Naval weapon systems' Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance gaps.<br>***FY 2019 Plans:***<br>Funds provided for continued NIFC flight test. Additionally, continues E-2D participation in NIFC-CA increment developmental and operational systems of systems ground, simulation, and flight testing. Continues fleet training development for NIFC capabilities.<br>***FY 2020 Base Plans:***<br>Funds provided for continued NIFC flight test. Additionally, continues E-2D participation in NIFC increment developmental and operational systems of systems ground, simulation, and flight testing. Continues fleet training development for NIFC capabilities.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | 37.756<br>- | 25.973<br>- | 25.601<br>- | 0.000<br>- | 25.601<br>- |
| ***Title:*** Accelerated Mid-Term Interoperability Improvement Program (AMIIP)<br>***Articles:***<br>***Description:*** Address the most severe data link related interoperability issues. This capability will significantly improve the quality of the tactical surveillance picture, reduce the possibility of leakers, mitigate Blue on Blue | 3.627<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| engagements and mid-identification of tracks. Provides stable sensor fusion foundation to support sensor/ weapon coordination requirements. Planned for DSSC-3.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No Funding requested in FY20. | | | | | |
| ***Title:*** Sensor Netting | 15.390 | 17.535 | 18.703 | 0.000 | 18.703 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provides fusion of data from off-board sources via a high bandwidth network that will allow E-2D to support second spiral of performance improvements for Naval Integrated Fire Control Testing (NIFC) capabilities. Additional details are classified. Planned for DSSC-5; however, an Early Operational Capability (EOC) of this weapon system improvement is planned for DSSC-4 (software only capabilities to deliver to the fleet) & the full capabilities will be delivered in DSSC-5.<br><br>***FY 2019 Plans:***<br>Funds provided for completion of system requirements development for Sensor Netting DSSC 4. Continuation of software development & integration of the mission computer and associated systems to provide the Sensor Netting solution for DSSC-4. Program will conduct Preliminary Design Review and Critical Design Review for Sensor Netting DSSC-4. Start software development and integration for Sensor Netting DSSC-5. Conduct Integrated Baseline Review and Preliminary Design Review for Sensor Netting DSSC-5.<br><br>***FY 2020 Base Plans:***<br>Funds provided for the continuation of software development & integration of the mission computer and associated systems to provide the Sensor Netting DSSC-5 solution. Program will conduct SIL Testing, Test Readiness Review (TRR) and Functional Readiness Review of the DSSC-4 solution, including completion of | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Developmental Testing (DT) prior to integration into the DSSC-4 final build. In addition, program will conduct Critical Design Review of the DSSC-5 solution.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increases from FY19 to FY20 due to current program plan. | | | | | |
| ***Title:*** Data Fusion | 26.922 | 22.563 | 27.508 | 0.000 | 27.508 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** E-2D Data Fusion and Fighter to Fighter Backlink are complementary capabilities to be integrated together, therefore, Fighter to Fighter has been incorporated as part of Data Fusion Phase 2.<br><br>E-2D Data Fusion Phase 1 provides a fusion engine to blend all on-board sensor derived track data (e.g. Electronic Surveillance) with already blended radar, Identify Friend or Foe and Cooperative Engagement Capability track files, enhancing situational awareness and tactical decision making. Successful E-2D NIFC engagements depend on a clear/unambiguous tactical picture and the shortest possible decision pipeline. Planned for DSSC-4.<br><br>E-2D Data Fusion Phase 2 provides a fusion engine to blend all off-board tactical data (e.g. Satellite Receiver System data, Fighter to Fighter backlink data) with already fused on-board tracks from the E-2D Data Fusion Phase 1 effort. Completing the Data Fusion of all track sources available to E-2D greatly enhances situational awareness and tactical decision making. Integrating Link-16 Network Participation Group 20 messages which improves interoperability between E-2D and participating US Navy fighters, including 5th generation aircraft. This enhances the combat effectiveness of the E-2D, increases situational awareness and shortens kill-chain timeliness (including NIFC). Planned for DSSC-5<br><br>***FY 2019 Plans:***<br>Funds provided for Phase 1 to begin systems engineering and integration. Program will conduct preliminary design review and critical design review for Phase 1. Program will begin requirements development for Phase 2 and conduct a system requirements review and preliminary design review for Phase 2.<br>***FY 2020 Base Plans:*** | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Funds provided to continue Phase 1 systems engineering and integration. Program will conduct test readiness review, functional readiness review and begin SIL test for Phase 1. Program will begin systems engineering and integration for Phase 2 and conduct critical design review for Phase 2.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increases from FY19 to FY20 due to current program plan. | | | | | |
| ***Title:*** Navigation Warfare (NAVWAR) | 9.095 | 8.571 | 8.169 | 0.000 | 8.169 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** E-2D Navigation Warfare (NAVWAR) prevents loss of Global Positioning System (GPS) by using a Controlled Reception Pattern Antenna (CRPA) and Antenna Electronics (AE) unit which will function to provide GPS access in an Electronic Attack (EA) environment. NAVWAR significantly reduces the likelihood of loss of critical GPS Position, Navigation and Timing functionality that is fundamental to E-2D battlespace awareness and its contributions to multiple link networks. Without NAVWAR capability, the E-2D AHE will be unable to provides its services in GPS contested airspace, putting Navy units at unacceptable risk and hindering Joint operational flexibility. NAVWAR capability will allow the E-2D AHE to operate in areas where signal disruption and jamming would prohibit unprotected GPS reception. With this new capability, the E-2D AHE will be able to provide continuous operations in a degraded GPS environment for mission areas that depend on GPS for precise position, navigation, and timing. Planned for DSSC-3.1.<br>***FY 2019 Plans:***<br>Funds provided to continue SIL test. Conduct Test Readiness Review, Functional Readiness Review and begin Developmental Test.<br>***FY 2020 Base Plans:***<br>Funds provided to continued developmental test.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decreases from FY19 to FY20 due to current program plan. | | | | | |
| ***Title:*** Stores Performance Assessment Requested Quality (SPARQ) | 8.676 | 8.003 | 7.806 | 0.000 | 7.806 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** E-2D Stores Performance Assessment Requested Quality (SPARQ) establishes real-time requirements for E-2D sensor contribution to system of systems Naval Integrated Fire Control (NIFC) solutions. SPARQ expands and optimizes operational employment envelopes, improving Air Wing ability to take advantage of system of systems capabilities of NIFC, reduces operational workload and latency of execution. Planned for DSSC-5.<br><br>***FY 2019 Plans:***<br>Funds provided for completion of system requirements development. Continuation of software development of the mission computer and associated systems to provide the SPARQ solution. Program will conduct Integrated Baseline Review and Preliminary Design Review.<br><br>***FY 2020 Base Plans:***<br>Funds provided for continuation of software development of the mission computer and associated systems to provide the SPARQ solution. Program will conduct Critical Design Review.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** Theater Combat Identification (CID)<br>***Articles:*** | 0.000<br>- | 0.000<br>- | 17.608<br>- | 0.000<br>- | 17.608<br>- |
| ***Description:*** E-2D Theater Combat Identification (CID) including Mission Computer Display Rearchitecture enables the E-2D to distribute Combat Identification (CID) data to the Carrier Strike Group (CSG). E-2D will receive National Technical Means (NTM) and tactical CID data at all security levels and filter/distribute at the highest possible security levels to the tactical edge. Using the Open Mission Systems (OMS) design, the new mission computer architecture will provide multi-level security and cyber hardening provisions to support current and planned capabilities. The OMS design will allow faster integration of these capabilities required to pace the evolving threat.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| New Start. Funds provided to conduct Integrated Baseline Review. Begin requirements development.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 is first year of funding for E-2D Theater Combat Identification (CID). | | | | | |
| ***Title:*** ALQ-217 Electronic Support Measures Upgrade & Survivability | 26.713 | 30.434 | 43.053 | 0.000 | 43.053 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** ALQ-217 digital upgrade greatly enhances Combat Identification (CID), battle space awareness, and effectiveness of blue forces. Expands capabilities of ALQ-217 hardware and software to enable defensive countermeasures to enable Carrier Strike Group (CSG) Air Defense in Highly Contested (HC) environments. Planned for DSSC-5.<br>E-2D Survivability develops additional capabilities for the ALQ-217 ESM. This capability is required to ensure the E-2D can perform its intended mission at locations required to support Naval and Joint Force operations. Planned for DSSC-6.<br>***FY 2019 Plans:***<br>Funds provided for the continuation of ALQ217 ESM requirements development. Will begin hardware and software development & integration, conduct Preliminary Design Review and Critical Design Review.<br>***FY 2020 Base Plans:***<br>Funds provided for the continuation of ALQ217 ESM hardware and software development & integration. Will conduct Functional Readiness Review and perform Chamber ground tests.<br>Funds provided for Survivability requirements development and will conduct Systems Requirements Review.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increases from FY19 to FY20 due to revised program plan to incorporate survivability. | | | | | |
| ***Title:*** Crypto Modernization/Frequency Remapping | 15.900 | 8.635 | 9.534 | 0.000 | 9.534 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** The E-2D Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/ JTRS) with concurrent Multi-netting will be integrated into the E-2D. This effort includes replacing the Multifunctional Information Distribution System-Low Volume Terminal (MIDS LVT) radio with MIDS/JTRS that has incorporated Link-16 concurrent Multi-netting (CMN-4) and replacing the JTIDS High Power Amplifier Group with a Link-16 High Power Amplifier which will address Crypto Modernization and Frequency Remapping. Planned for DSSC-3.1.<br><br>***FY 2019 Plans:***<br>Funds are provided to continue hardware & software development & integration and conduct Test Readiness Review and Functional Readiness Review. Begin developmental test.<br><br>***FY 2020 Base Plans:***<br>Funds are provided for completion of developmental test assist.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increases from FY19 to FY20 due to current program plan. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 273.840 | 198.565 | 232.752 | 0.000 | 232.752 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0195: *E-2D AHE* | 987.313 | 1,174.371 | 870.612 | - | 870.612 | 839.757 | 1,011.019 | 1,233.669 | 195.638 | 0.000 | 18,392.796 |
| • APN/0605: *Initial Spares - E-2* | 10.350 | 12.497 | 6.926 | - | 6.926 | 3.632 | 3.395 | 3.115 | 3.110 | Continuing | Continuing |
| • APN/0544: *E-2 Series* | 53.713 | 82.980 | 117.059 | - | 117.059 | 184.307 | 243.124 | 240.587 | 265.830 | 785.310 | 3,468.675 |

**Remarks**

**D. Acquisition Strategy**

Milestone C Acquisition Strategy was approved by Milestone Decision Authority, Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) on 29 Dec 2008. Milestone C approval to proceed into Production and Deployment was given 11 June 2009 by USD (AT&L). Certification for entrance into Initial Operational Test & Evaluation was received on 06 Feb 2012. Full Rate Production Acquisition Strategy approved on 20 August 2012. Initial Operational Test & Evaluation concluded 1 October 2012. Successfully held a Defense Acquisition Board for Full Rate Production. Received a successful decision to enter into Full Rate Production on 01 March 2013. Initial Operational Capability achieved on 10 October 2014.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

**E. Performance Metrics**

Successfully held a Gate 6 review on 23 January 2018.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>3051 / *E-2D Adv Hawkeye* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware-Fatigue | C/CPFF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 29.652 | 16.703 | Feb 2018 | 9.530 | Nov 2018 | 9.302 | Nov 2019 | - | | 9.302 | 53.619 | 118.806 | 118.806 |
| Primary Hardware Dev-AMIIP/SIPRChat & TTNT | C/CPIF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 99.084 | 9.898 | Jun 2018 | 4.122 | Feb 2019 | 5.898 | Nov 2019 | - | | 5.898 | 0.000 | 119.002 | 119.002 |
| Primary Hardware Dev-TTNT | SS/FFP | Data Link Solutions : Cedar Rapids, IA | 20.568 | 1.619 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 22.187 | 22.187 |
| Primary Hardware Dev - TTNT | SS/CPFF | ViaSat : Carlsbad, CA | 5.247 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.247 | 5.247 |
| Primary Hardware-Aerial Refueling | SS/CPIF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 254.029 | 28.019 | Oct 2017 | 9.874 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 291.922 | 291.922 |
| Primary Hardware Dev-NAVWAR | SS/CPFF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 2.380 | 7.010 | Dec 2017 | 4.144 | Dec 2018 | 4.910 | Dec 2019 | - | | 4.910 | 0.000 | 18.444 | 18.444 |
| Primary Hardware Dev - TTNT | SS/CPFF | NorthStar Scientific Corp. : Kapole, HI | 8.634 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.634 | 8.634 |
| Primary Hardware Dev - CMFR | C/CPFF | Northrop Grumman Corporation : Melbourne, FL | 3.200 | 4.334 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.534 | 7.534 |
| Primary Hardware Dev - ESM | C/CPFF | Lockheed Martin : New York, NY | 6.043 | 9.614 | Jun 2018 | 16.650 | Dec 2018 | 18.298 | Dec 2019 | - | | 18.298 | 17.550 | 68.155 | 68.155 |
| Primary Hardware Dev - Theater CID | C/CPIF | Navy Syst Mgt Activity : Arlingron, VA | 0.000 | 0.000 | | 0.000 | | 10.338 | Dec 2019 | - | | 10.338 | 243.409 | 253.747 | 253.747 |
| Primary Hardware Dev - Cyber | C/CPIF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 0.000 | 0.000 | | 0.000 | | 7.780 | Dec 2019 | - | | 7.780 | 119.960 | 127.740 | 127.740 |
| Training Development | SS/FFP | Rockwell Collins : Cedar Rapids, IA | 17.624 | 14.178 | Dec 2017 | 1.903 | Dec 2018 | 1.740 | Dec 2019 | - | | 1.740 | 13.039 | 48.484 | 48.484 |
| Primary Software Dev - Thearter CID | C/CPIF | Navy Syst Mgt Activity : Arlington, VA | 0.000 | 0.000 | | 0.000 | | 5.356 | Dec 2019 | - | | 5.356 | 0.000 | 5.356 | 5.356 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>3051 / *E-2D Adv Hawkeye* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Software Dev - Various | Various | Navy Syst Mgt Activity : Arlington, VA | 83.394 | 25.215 | Dec 2017 | 25.847 | Dec 2018 | 26.453 | Dec 2019 | - | | 26.453 | 490.937 | 651.846 | 651.846 |
| Primary Software Development - ESM | C/CPFF | Lockheed Martin : New York, NY | 2.990 | 5.000 | Dec 2017 | 9.607 | Dec 2018 | 9.866 | Dec 2019 | - | | 9.866 | 16.737 | 44.200 | 44.200 |
| System Engineering | Various | Various : Various | 0.913 | 0.000 | | 1.227 | Dec 2018 | 3.766 | Dec 2019 | - | | 3.766 | 9.069 | 14.975 | 14.975 |
| Prior Year Prod Dev costs no longer funded in FYDP | Various | Various : Various | 3,603.253 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3,603.253 | - |
| | | **Subtotal** | 4,137.011 | 121.590 | | 82.904 | | 103.707 | | - | | 103.707 | 964.320 | 5,409.532 | N/A |

**Remarks**

Totals may not add due to rounding.
Primary Software Development, Navy Syst Mgt Activity cost category increased due to fact of life changes in contract award.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | Various | Navy Syst Mgt Activity : Arlington, VA | 23.420 | 0.200 | Dec 2017 | 0.200 | Dec 2018 | 0.200 | Dec 2019 | - | | 0.200 | 1.204 | 25.224 | 25.224 |
| Software Development-SN | C/CPFF | Navy Syst Mgt Activity : Arlington, VA | 7.735 | 12.793 | Dec 2017 | 14.368 | Dec 2018 | 13.023 | Dec 2019 | - | | 13.023 | 27.601 | 75.520 | 77.520 |
| Software Development-Data Fusion | C/CPFF | Navy Syst Mgt Activity : Arlington, VA | 16.340 | 22.491 | Dec 2017 | 12.214 | Dec 2018 | 12.340 | Dec 2019 | - | | 12.340 | 32.845 | 96.230 | 96.230 |
| Software Development-CEA | C/CPFF | Navy Syst Mgt Activity : Arlington, VA | 2.022 | 1.822 | Dec 2017 | 1.343 | Dec 2018 | 2.552 | Dec 2019 | - | | 2.552 | 0.500 | 8.239 | 8.239 |
| Software Development - SPARQ | C/CPFF | Navy Syst Mgt Activity : Arlington, VA | 6.017 | 7.651 | Dec 2017 | 7.163 | Dec 2018 | 6.930 | Dec 2019 | - | | 6.930 | 11.583 | 39.344 | 39.344 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>3051 / *E-2D Adv Hawkeye* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development-SIPRChat | WR | SPAWAR : San Diego | 11.333 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.333 | 11.333 |
| Software Development-TTNT | SS/CPIF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 0.200 | 1.583 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.783 | 1.783 |
| Software Development-NAVWAR | SS/CPIF | Northrop Grumman Corporation (NGC) : Melbourne, FL | 2.900 | 0.550 | Dec 2017 | 0.418 | Dec 2018 | 0.070 | Dec 2019 | - | | 0.070 | 0.320 | 4.258 | 4.258 |
| Software Development - ESM | SS/CPIF | Northrop Grumman Corporation : Melbourne, FL | 0.000 | 0.000 | | 1.241 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.241 | 1.241 |
| Software Development - CMFR | C/CPFF | Northrop Grumman Corporation : Melbourne, FL | 1.748 | 9.416 | Jul 2018 | 4.467 | Dec 2018 | 9.137 | Dec 2019 | - | | 9.137 | 9.137 | 33.905 | 33.905 |
| Government Engineering Support | WR | Naval Air Warfare Center Aircraft Division (NAWCAD : Pax River, MD | 128.141 | 17.848 | Nov 2017 | 15.750 | Dec 2018 | 16.067 | Dec 2019 | - | | 16.067 | 70.742 | 248.548 | - |
| Government Engineering Support | WR | Naval Air Warfare Center Training Systems Division : Orlando, FL | 12.545 | 0.472 | Nov 2017 | 0.400 | Nov 2018 | 0.400 | Dec 2019 | - | | 0.400 | 0.000 | 13.817 | - |
| Government Engineering Support | Various | Various : Various | 17.227 | 0.496 | Nov 2017 | 0.509 | Nov 2018 | 0.120 | Nov 2019 | - | | 0.120 | 0.120 | 18.472 | - |
| Integrated Logistics Support | Various | Various : Various | 10.772 | 3.149 | Nov 2017 | 3.035 | Nov 2018 | 2.943 | Nov 2019 | - | | 2.943 | 18.206 | 38.105 | - |
| Contractor Engineering Support ETS | C/CPFF | Precise : Lexington Park, MD | 0.390 | 1.258 | Jan 2018 | 2.477 | Jan 2019 | 1.481 | Jan 2020 | - | | 1.481 | 9.403 | 15.009 | 15.009 |
| Technical Data | Various | Various : Various | 1.544 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.544 | - |
| Prior Year Support costs no longer funded in FYDP | Various | Various : Various | 110.150 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 110.150 | - |
| | | **Subtotal** | 352.484 | 79.729 | | 63.585 | | 65.263 | | - | | 65.263 | 181.661 | 742.722 | N/A |

**Remarks**

Totals may not add due to rounding.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>3051 / *E-2D Adv Hawkeye* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T&E | WR | NAWCAD : Pax River, MD | 194.590 | 47.791 | Nov 2017 | 40.051 | Nov 2018 | 44.050 | Nov 2019 | - | | 44.050 | 351.598 | 678.080 | - |
| Developmental T&E | Various | Various : Various | 36.380 | 0.100 | Oct 2017 | 0.100 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | 0.000 | 36.680 | - |
| Developmental T&E - ROR | SS/CPFF | Northrop Grumman Corporation(NGC) : Melbourne, FL | 7.272 | 5.980 | Nov 2017 | 2.500 | Nov 2018 | 3.186 | Dec 2019 | - | | 3.186 | 21.088 | 40.026 | 40.026 |
| Developmental T&E ETS | C/CPFF | Various : Various | 11.169 | 1.703 | Feb 2018 | 1.618 | Feb 2019 | 2.227 | Feb 2020 | - | | 2.227 | 14.047 | 30.764 | 30.764 |
| Operational T&E | WR | NAWCAD : Pax River, MD | 24.773 | 2.801 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 1.650 | 29.224 | 29.224 |
| Operational T&E | Various | Various : Various | 10.481 | 1.013 | Nov 2017 | 6.347 | Nov 2018 | 12.670 | Nov 2019 | - | | 12.670 | 79.400 | 109.911 | - |
| Test Assets | Various | Various : Various | 6.601 | 12.783 | Nov 2017 | 1.131 | Nov 2018 | 1.152 | Dec 2019 | - | | 1.152 | 7.257 | 28.924 | - |
| Prior Year T&E costs no longer funded in FYDP | Various | Various : Various | 73.994 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 73.994 | - |
| | | **Subtotal** | 365.260 | 72.171 | | 51.747 | | 63.385 | | - | | 63.385 | 475.040 | 1,027.603 | N/A |

**Remarks**

Totals may not add due to rounding.
Developmental Test & Evaluation (T&E), Developmental T&E (Engineering & Technical Services) and Operational T&E - various contractors and award dates throughout the fiscal year. FY20 NAWCAD Pax increased funding due to scheduled Fleet Release for DSSC-3 & DSSC-4 Software merge.
Operational T&E requirement increase from FY19 to FY20 due to scheduled test for NIFC.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | Various : Various | 3.089 | 0.350 | Oct 2017 | 0.329 | Oct 2018 | 0.397 | Oct 2019 | - | | 0.397 | 1.761 | 5.926 | - |
| Program Mgmt Supt | Various | Vsrious : Various | 0.094 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.094 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>3051 / *E-2D Adv Hawkeye* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Mgmt costs no longer funded in FYDP | Various | Various : Various | 66.614 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 66.614 | - |
| | | **Subtotal** | 69.797 | 0.350 | | 0.329 | | 0.397 | | - | | 0.397 | 1.761 | 72.634 | N/A |

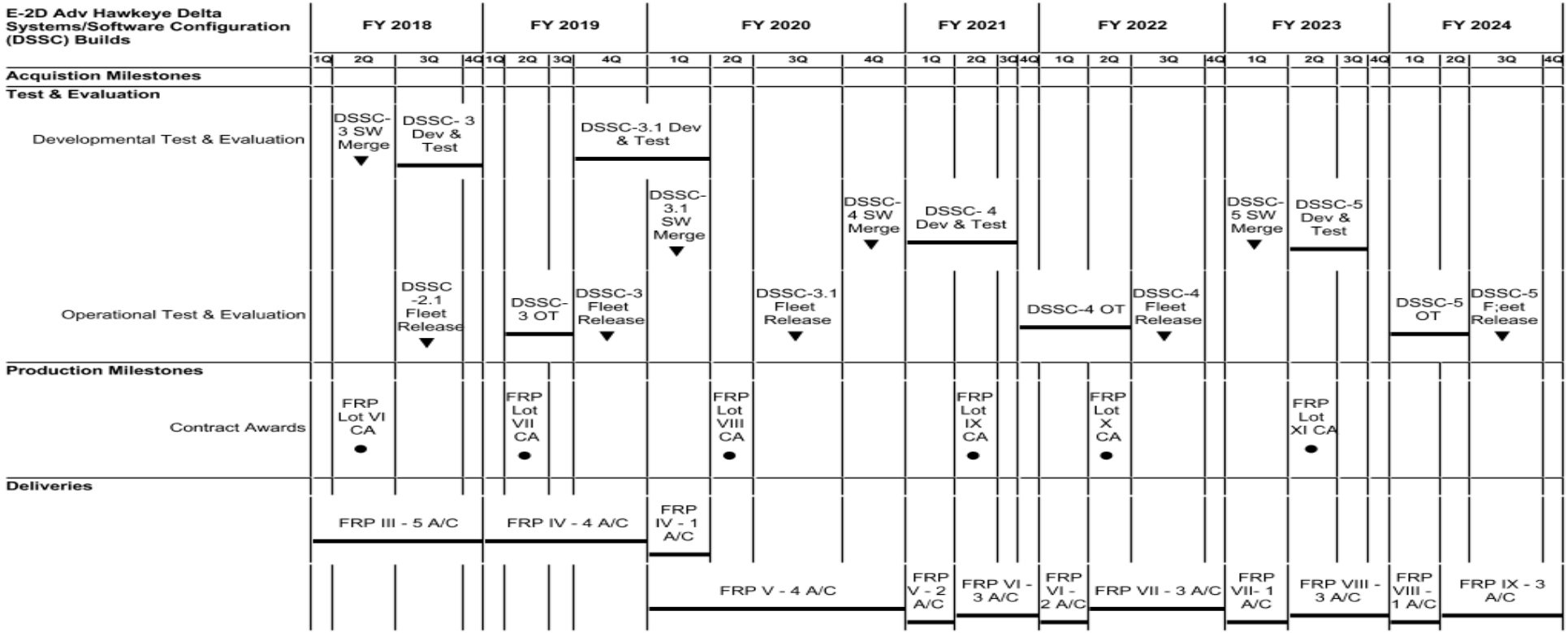
**Remarks**

Totals may not add due to rounding.
Contractor Engineering Support, Government Engineering Support, Program Support and Travel - various contractors and/or award dates throughout fiscal year.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 4,924.552 | 273.840 | | 198.565 | | 232.752 | | - | | 232.752 | 1,622.782 | 7,252.491 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

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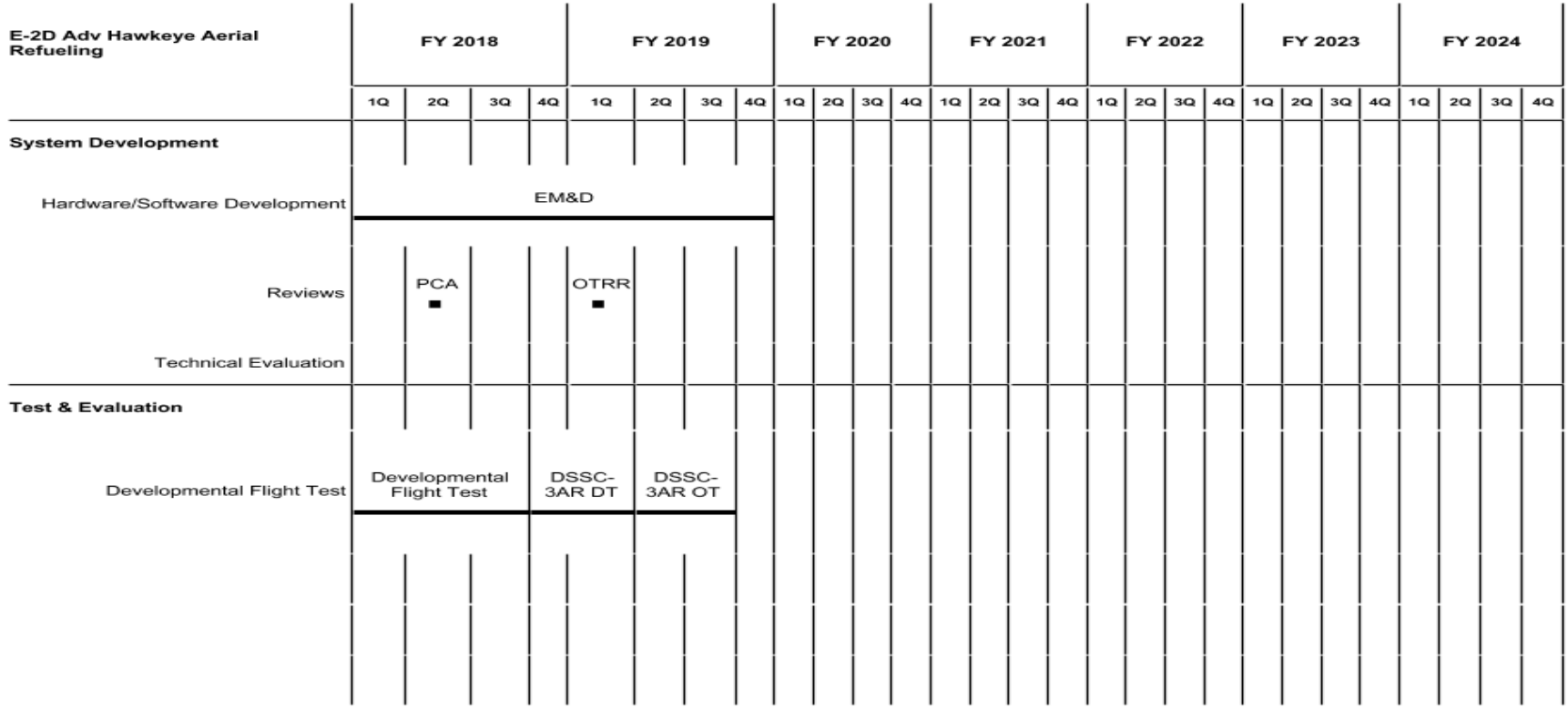
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

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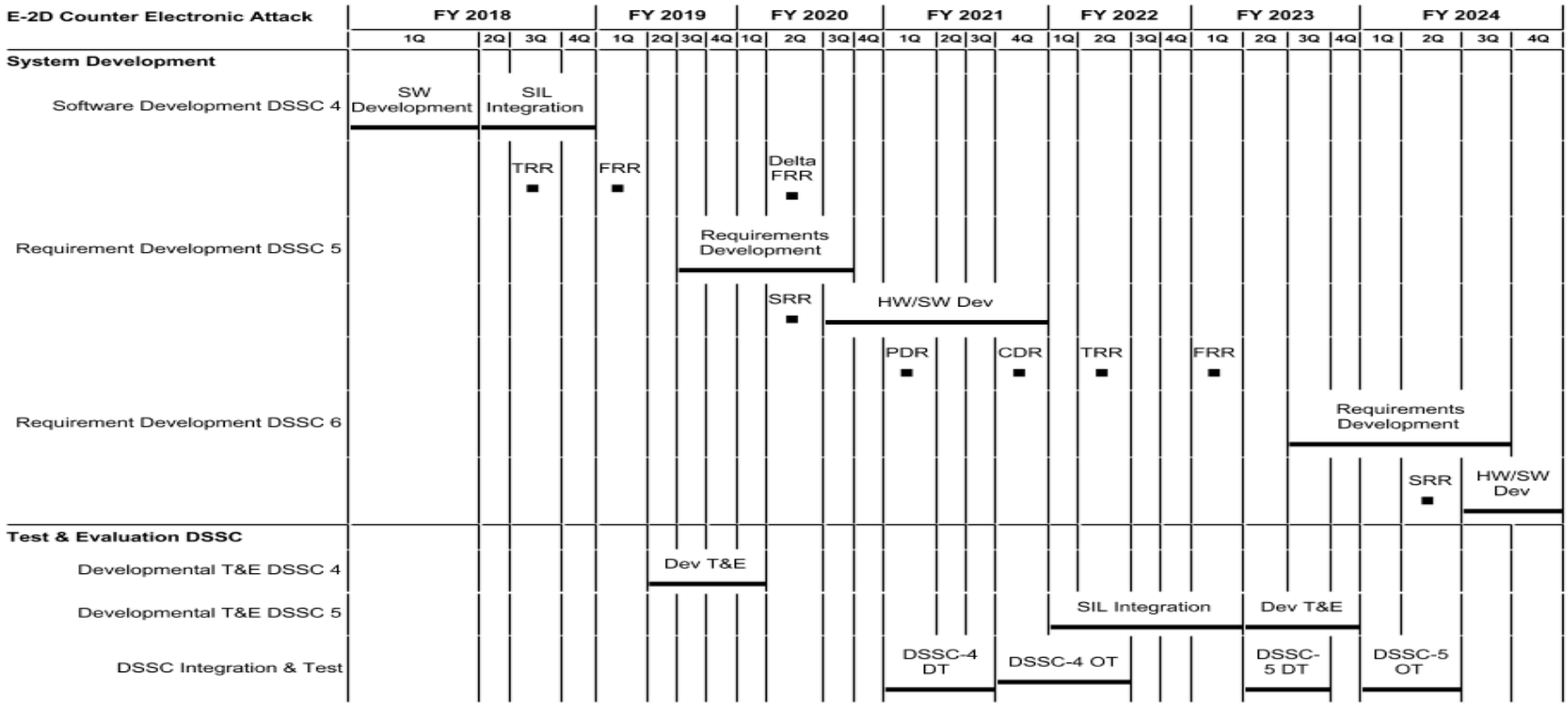
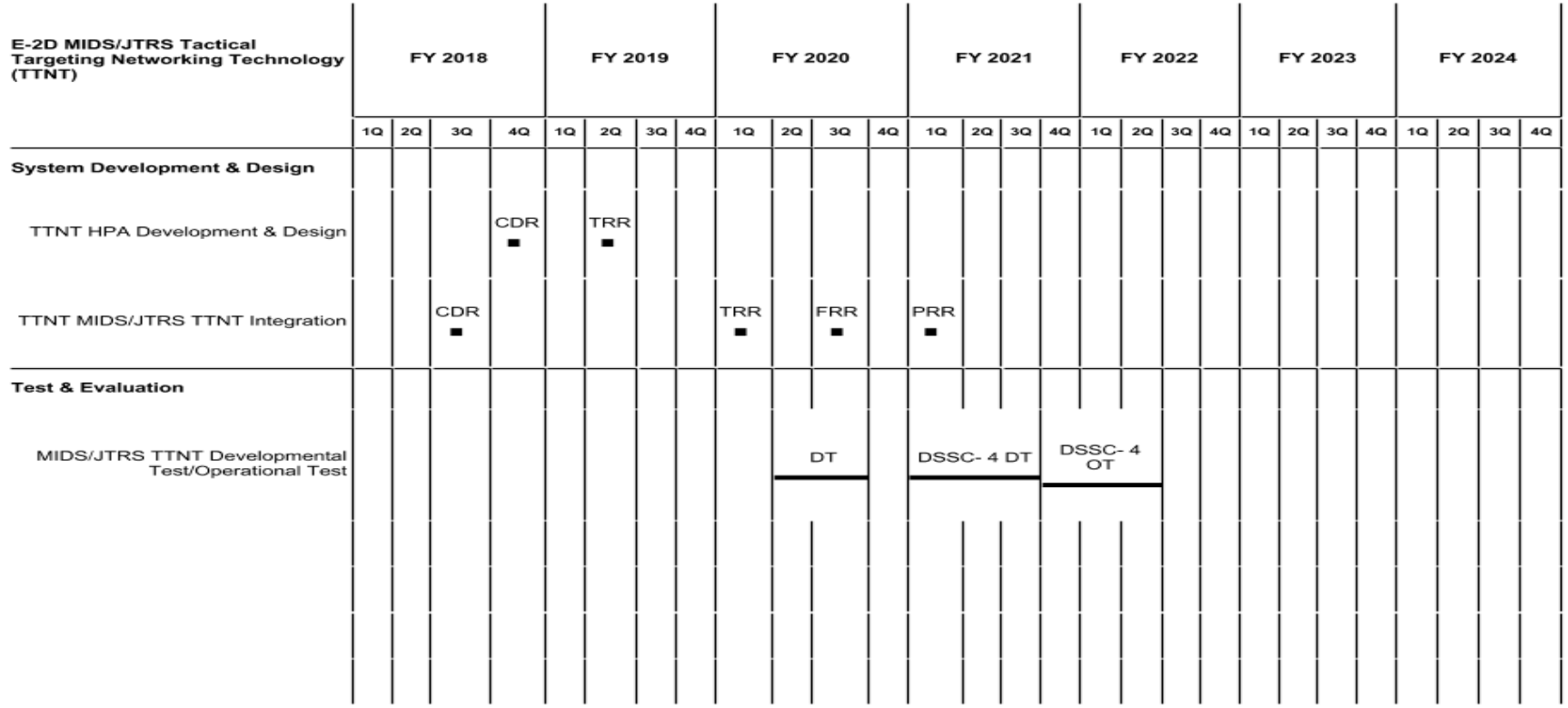
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



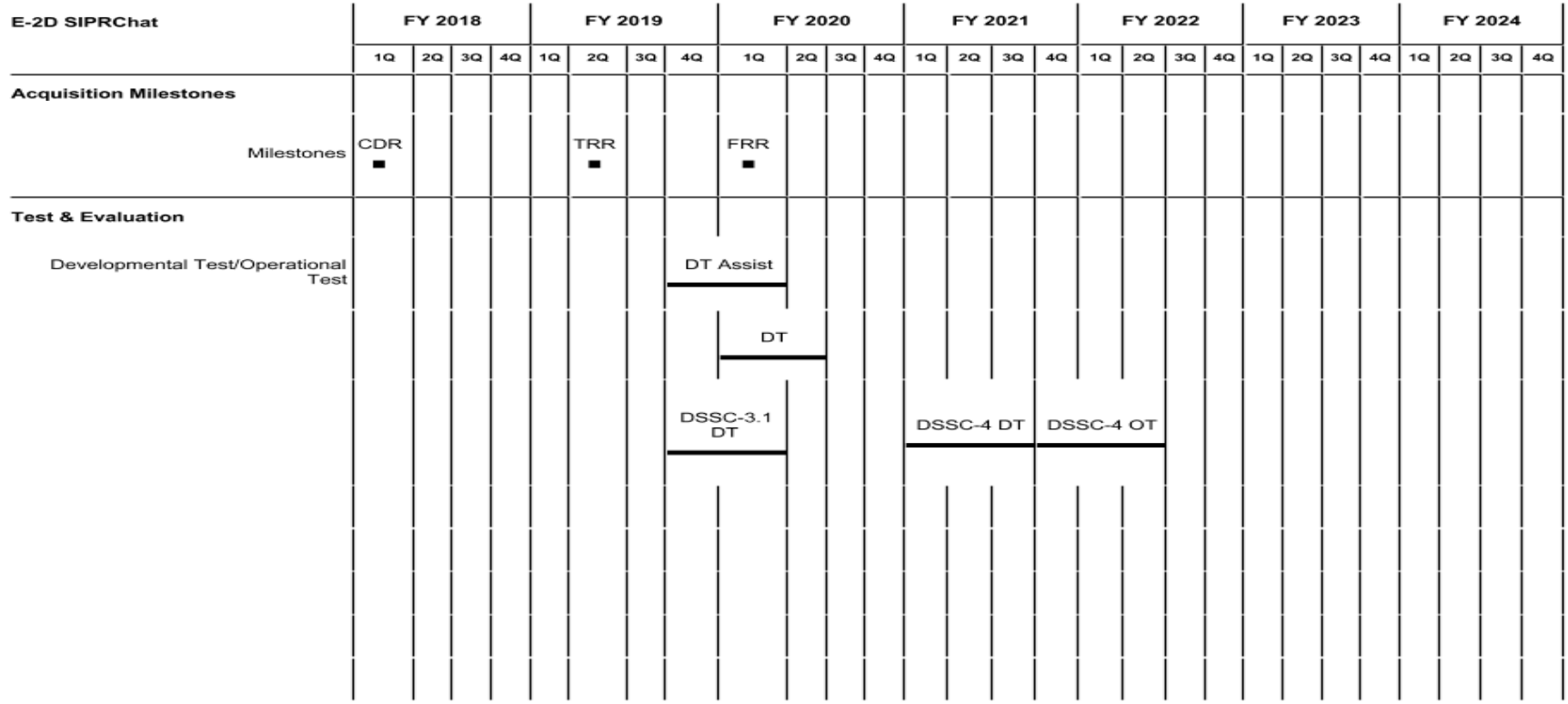

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



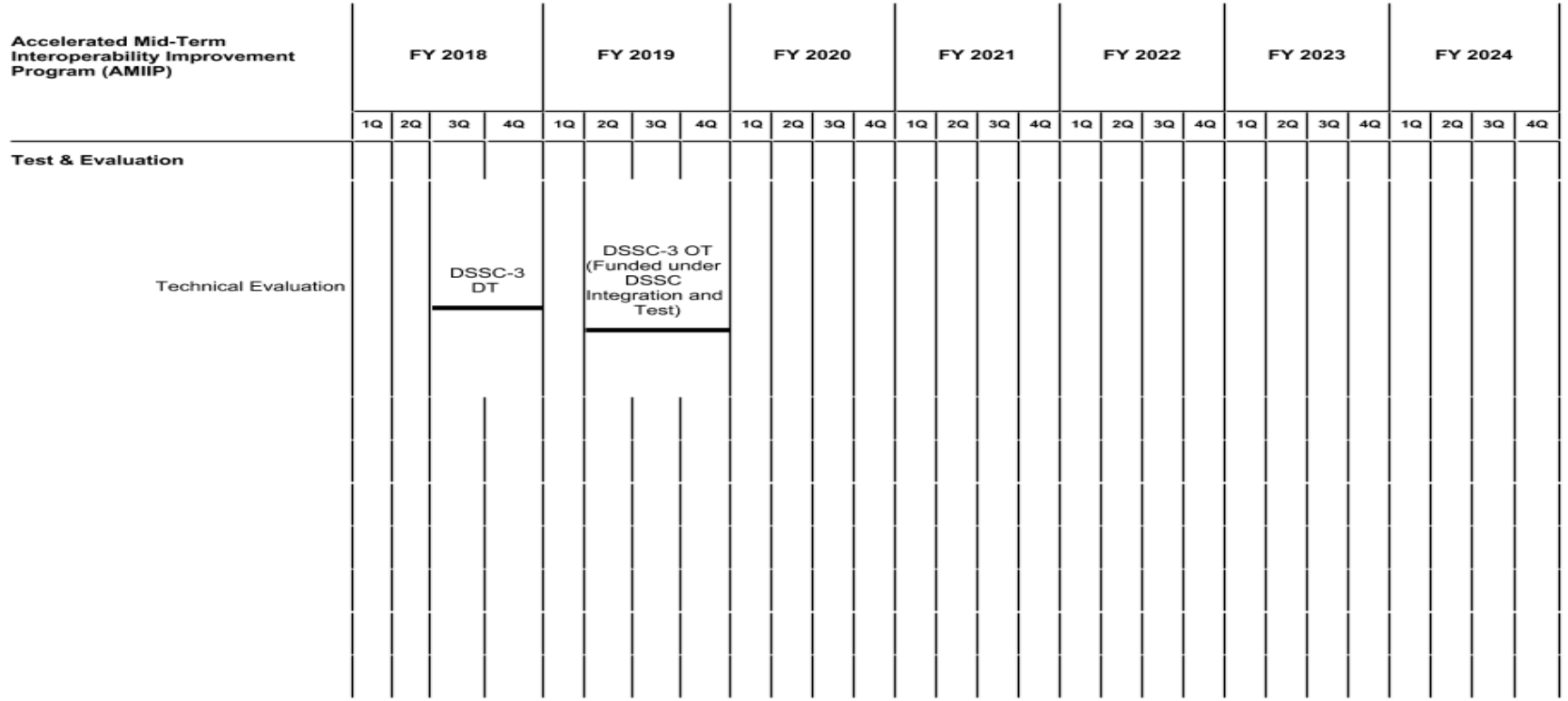

2020PB - 0604234N - 3051

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



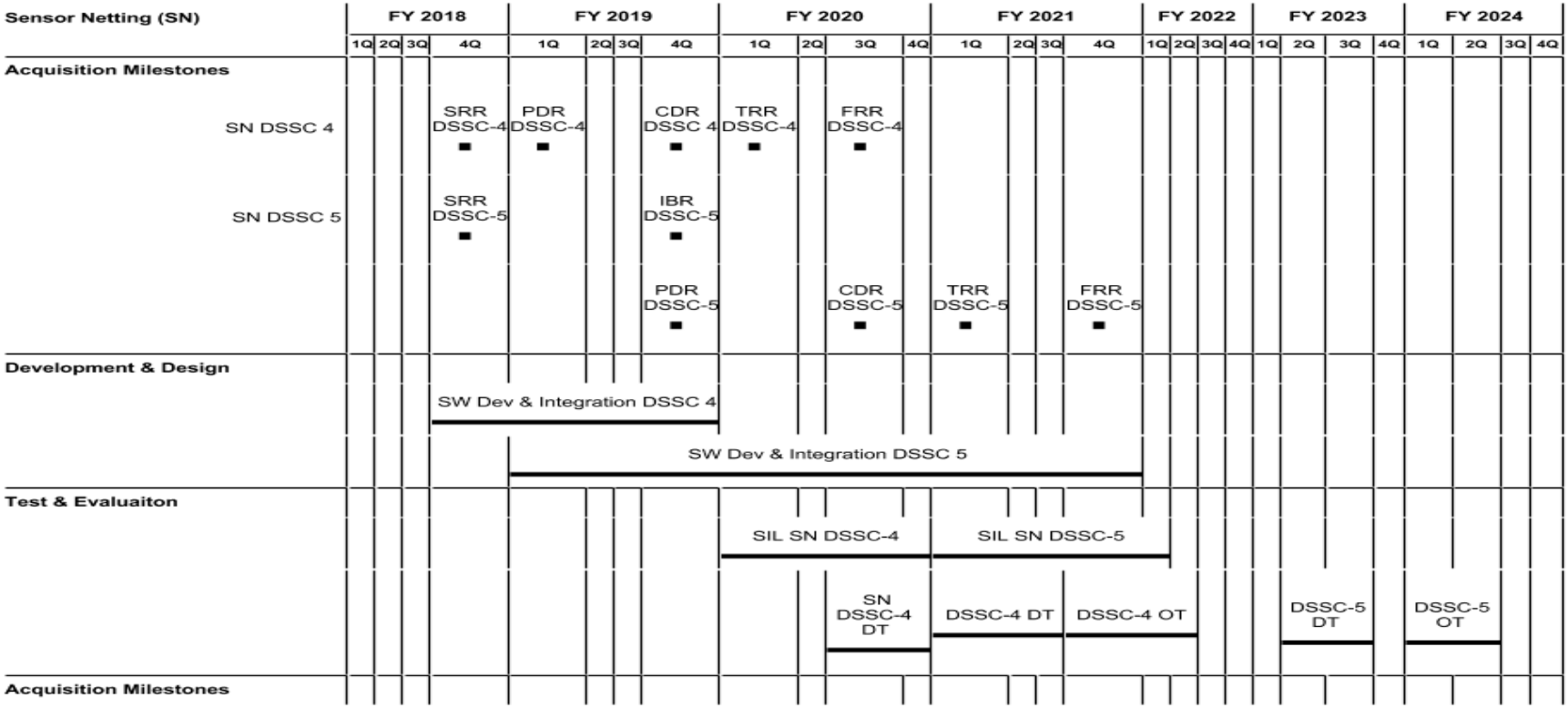

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



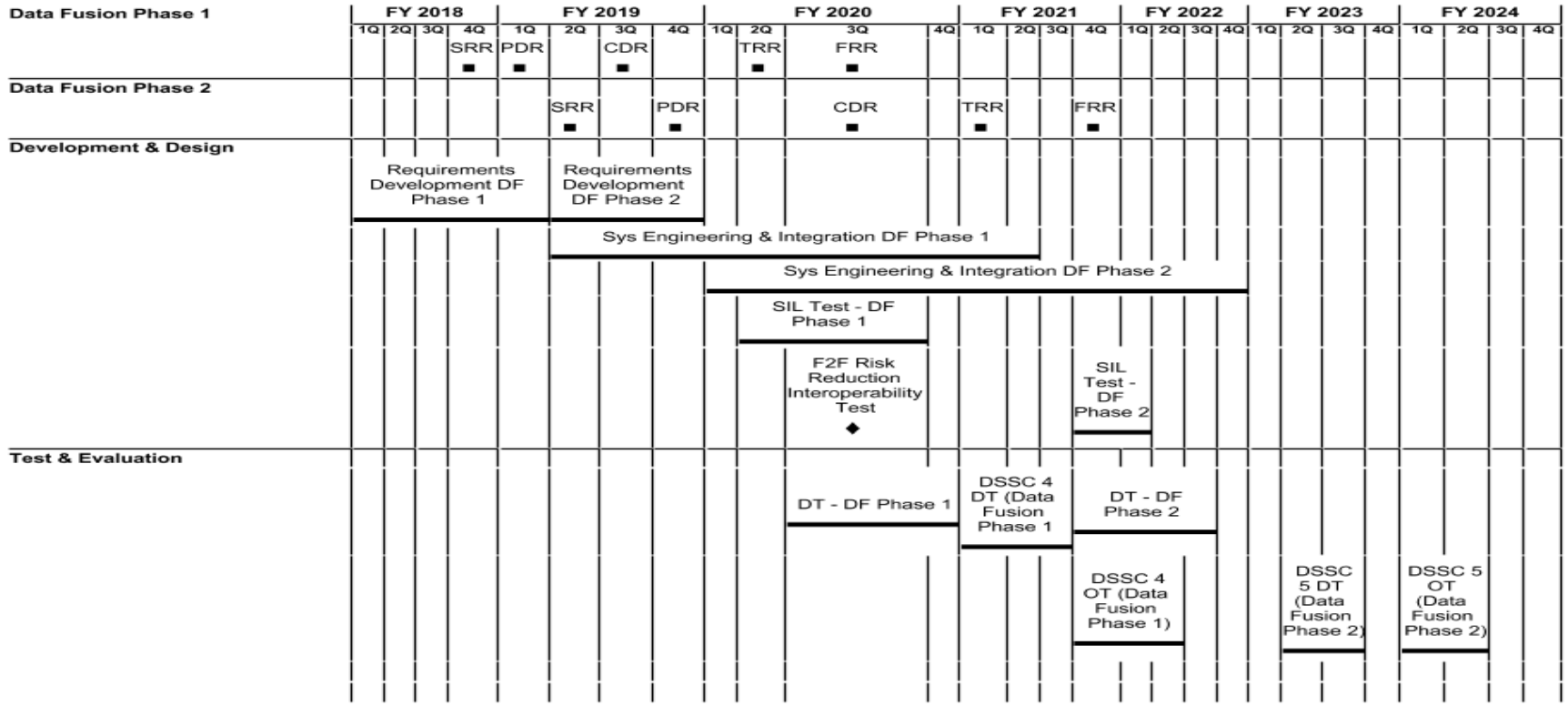

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



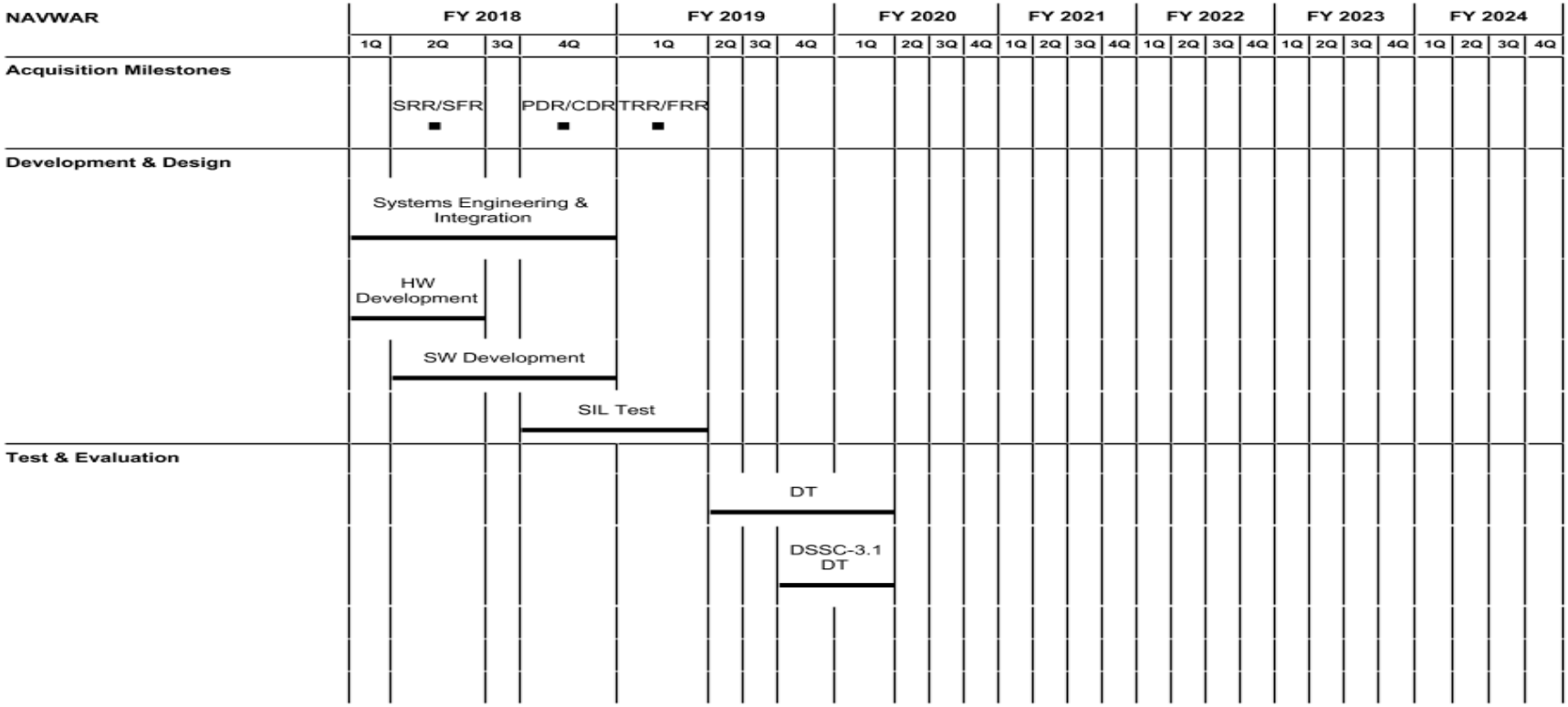

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



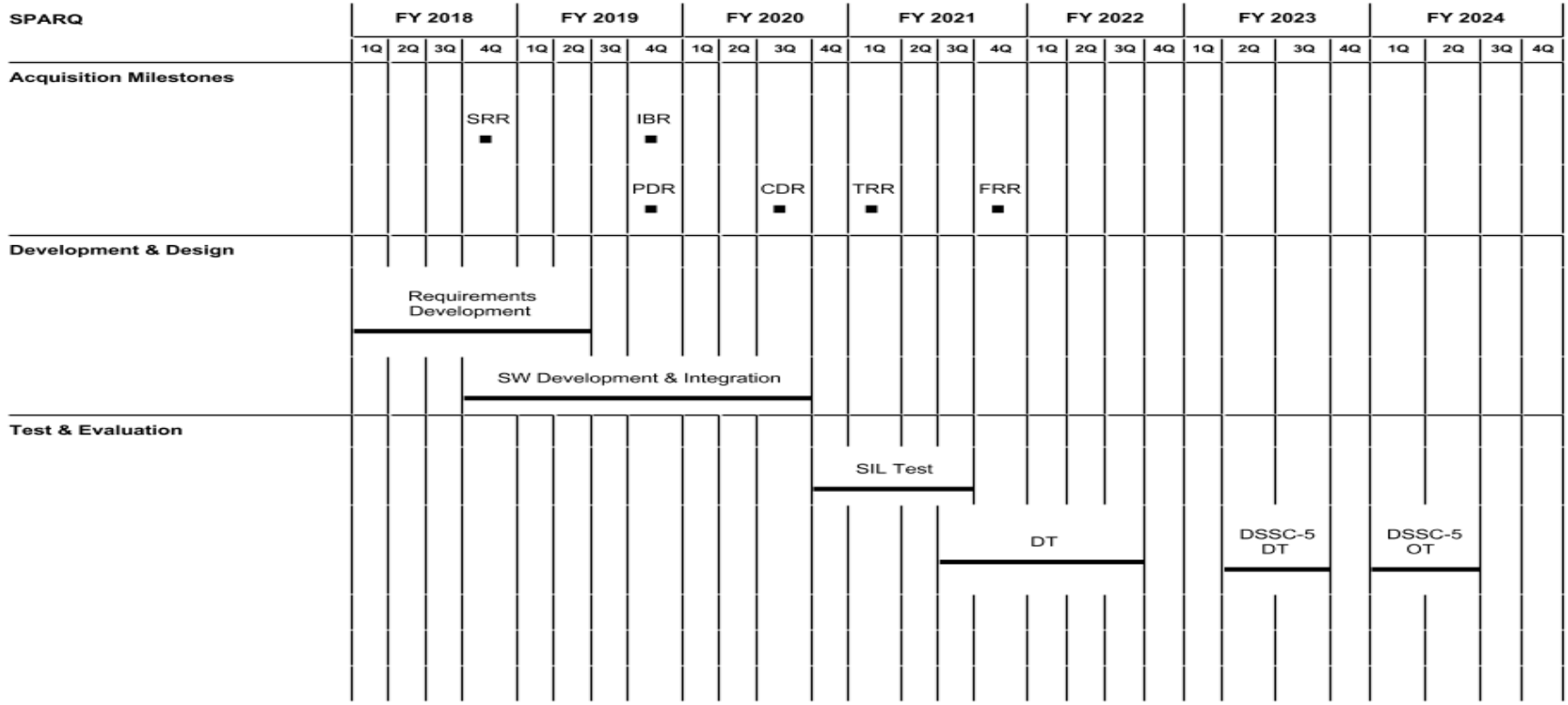

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



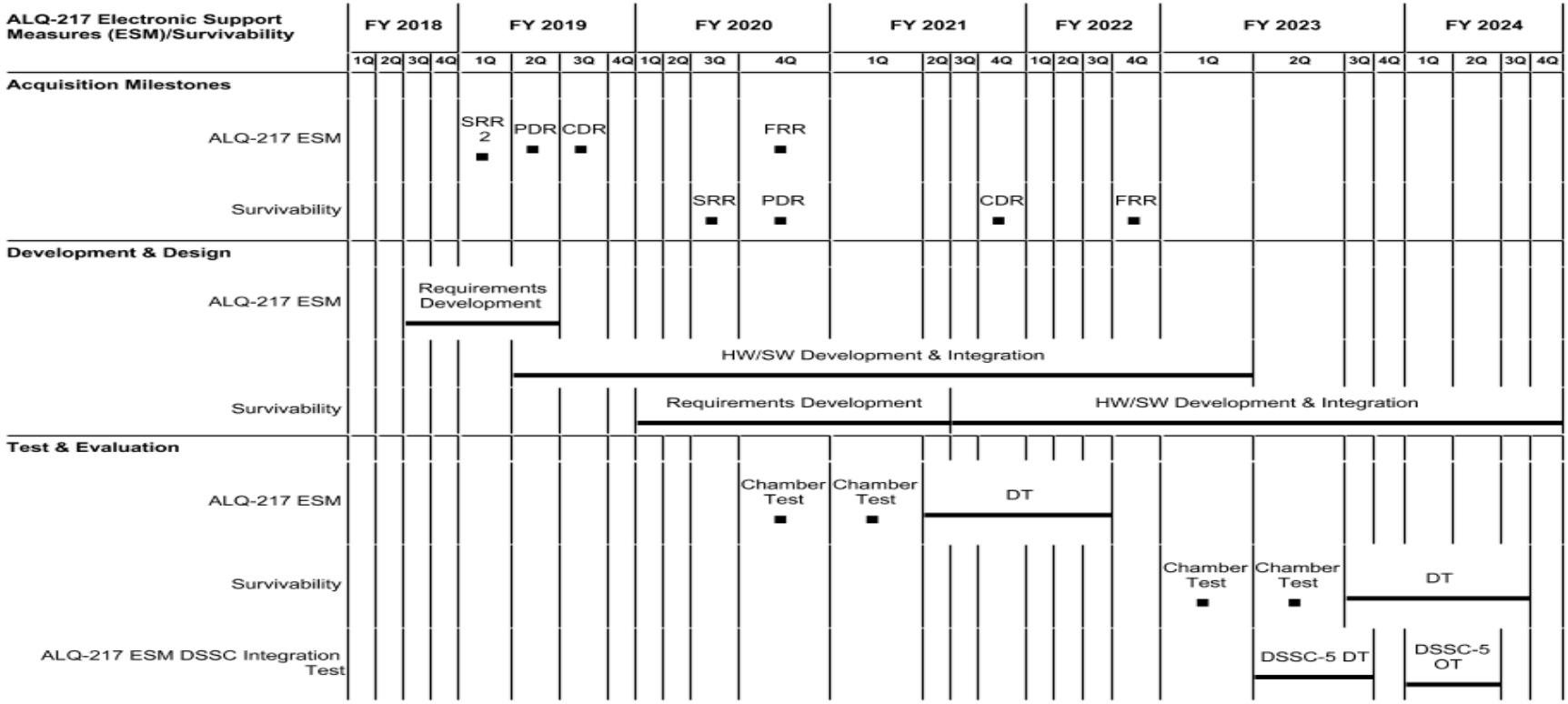

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



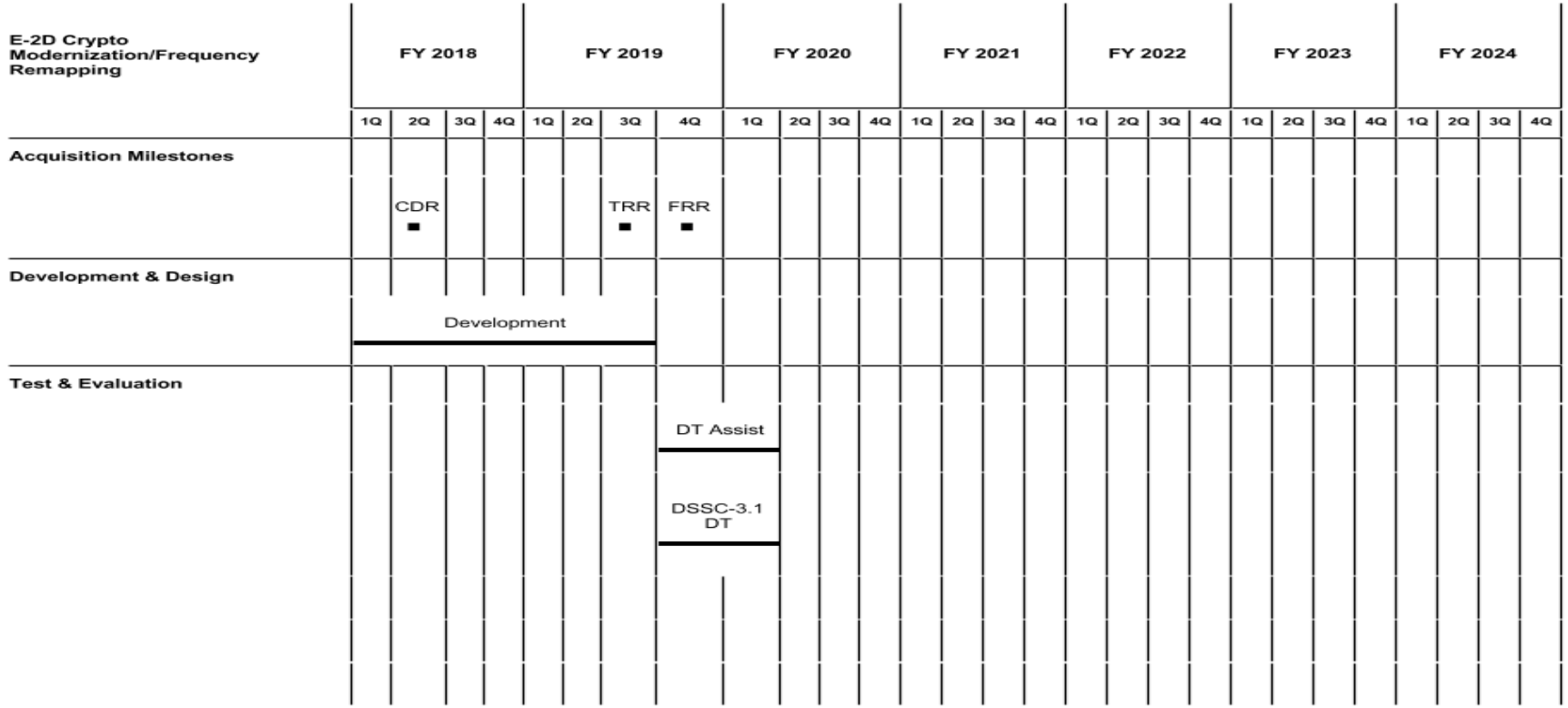

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |



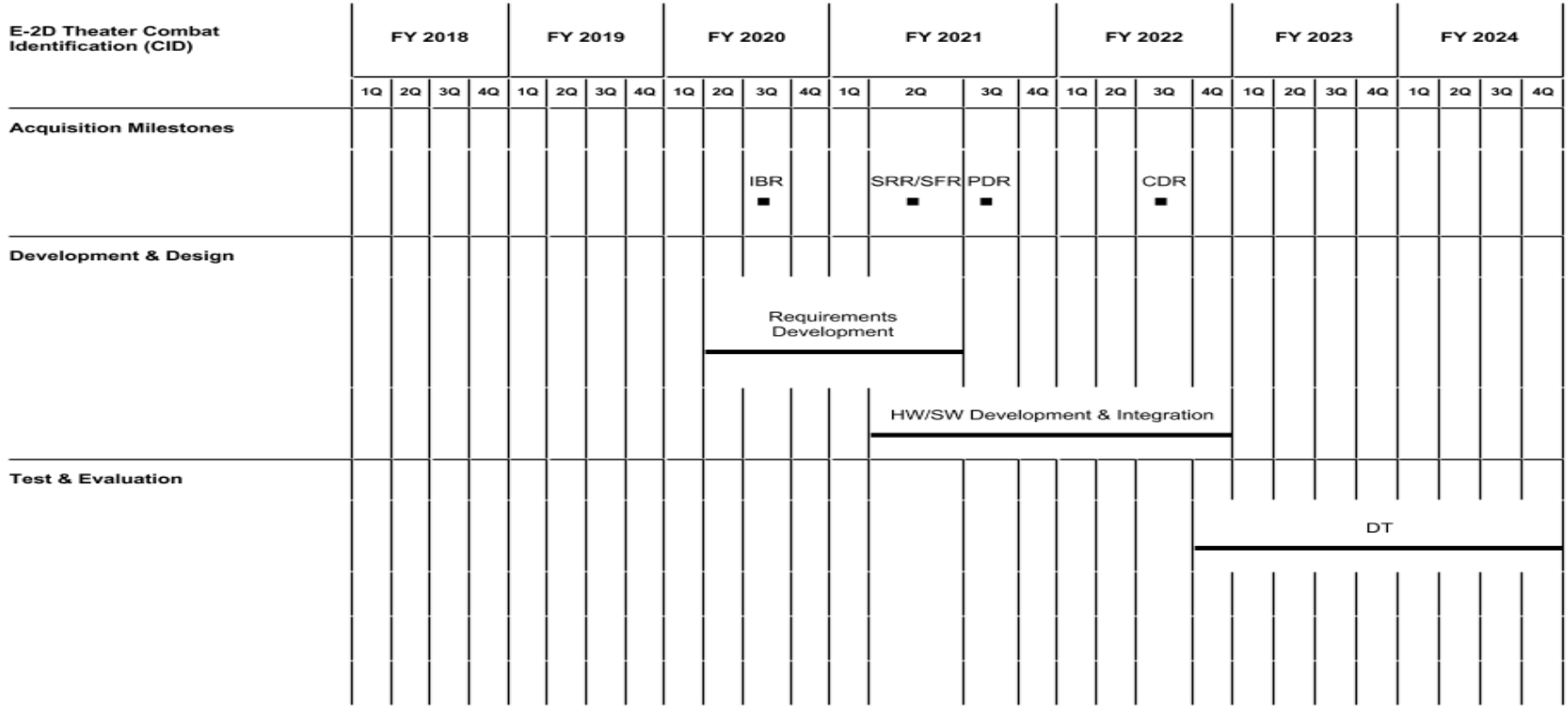

*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |




*2020PB - 0604234N - 3051*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |




2020PB - 0604234N - 3051

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***E-2D Adv Hawkeye Delta Systems/Software Configuration (DSSC) Builds*** | | | | |
| Test & Evaluation: Developmental Test & Evaluation: DSSC-3 Capability Dev & Testing | 3 | 2018 | 4 | 2018 |
| Test & Evaluation: Developmental Test & Evaluation: Software Merge - DSSC-3 | 2 | 2018 | 2 | 2018 |
| Test & Evaluation: Developmental Test & Evaluation: DSSC-3.1 Capability Dev & Testing | 4 | 2019 | 1 | 2020 |
| Test & Evaluation: Developmental Test & Evaluation: Software Merge - DSSC-3.1 | 1 | 2020 | 1 | 2020 |
| Test & Evaluation: Developmental Test & Evaluation: DSSC-4 Capability Dev & Testing | 1 | 2021 | 3 | 2021 |
| Test & Evaluation: Developmental Test & Evaluation: Software Merge DSSC-4 | 4 | 2020 | 4 | 2020 |
| Test & Evaluation: Developmental Test & Evaluation: DSSC-5 Capability Dev & Testing | 2 | 2023 | 3 | 2023 |
| Test & Evaluation: Developmental Test & Evaluation: Software Merge DSSC-5 | 1 | 2023 | 1 | 2023 |
| Test & Evaluation: Operational Test & Evaluation: DSSC- 2.1 Fleet Release | 3 | 2018 | 3 | 2018 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-3 Operational Test | 2 | 2019 | 3 | 2019 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-3 Fleeet Release | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-3.1 Fleet Release | 3 | 2020 | 3 | 2020 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-4 Operational Test | 4 | 2021 | 2 | 2022 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-4 Fleet Release | 3 | 2022 | 3 | 2022 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-5 Operational Test | 1 | 2024 | 2 | 2024 |
| Test & Evaluation: Operational Test & Evaluation: DSSC-5 Fleet Release | 3 | 2024 | 3 | 2024 |
| Production Milestones: Contract Awards: Production Milestones - FRP Lot VI CA | 2 | 2018 | 2 | 2018 |
| Production Milestones: Contract Awards: Production Milestones - FRP Lot VII CA | 2 | 2019 | 2 | 2019 |
| Production Milestones: Contract Awards: Production Milestones - FRP Lot VIII CA | 2 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: Contract Awards: Production Milestones - FRP Lot IX CA | 2 | 2021 | 2 | 2021 |
| Production Milestones: Contract Awards: Production Milestones - FRP Lot X CA | 2 | 2022 | 2 | 2022 |
| Production Milestones: Contract Awards: Production Milestones - FRP Lot XI CA | 2 | 2023 | 2 | 2023 |
| Deliveries: Production Deliveries - FRP III (4 A/C) | 1 | 2018 | 4 | 2018 |
| Deliveries: Production Deliveries - FRP IV (5 A/C) | 1 | 2019 | 4 | 2019 |
| Deliveries: Production Deliveries - FRP IV (1 A/C) | 1 | 2020 | 1 | 2020 |
| Deliveries: Production Deliveries - FRP V (4 A/C) | 1 | 2020 | 4 | 2020 |
| Deliveries: Production Deliveries - FRP V (2 A/C) | 1 | 2021 | 1 | 2021 |
| Deliveries: Production Deliveries - FRP VI (3 A/C) | 2 | 2021 | 4 | 2021 |
| Deliveries: Production Deliveries - FRP VI (2 A/C) | 1 | 2022 | 1 | 2022 |
| Deliveries: Production Deliveries - FRP VII (3 A/C) | 2 | 2022 | 4 | 2022 |
| Deliveries: Production Deliveries - FRP VII (1 A/C) | 1 | 2023 | 1 | 2023 |
| Deliveries: Production Deliveries - FRP VIII (3 A/C) | 2 | 2023 | 4 | 2023 |
| Deliveries: Production Deliveries - FRP VIII (1 A/C) | 1 | 2024 | 1 | 2024 |
| Deliveries: Production Deliveries - FRP IX (3 A/C) | 2 | 2024 | 4 | 2024 |
| ***E-2D Adv Hawkeye Aerial Refueling*** | | | | |
| System Development: Hardware/Software Development: Aerial Refueling - Engineering & Manufacturing Development | 1 | 2018 | 4 | 2019 |
| System Development: Reviews: Aerial Refueling - Physical Configuration Audit | 2 | 2018 | 2 | 2018 |
| System Development: Reviews: Aerial Refueling - Operational Test Readiness Review | 1 | 2019 | 1 | 2019 |
| Test & Evaluation: Developmental Flight Test: Developmental Flight Test | 1 | 2018 | 3 | 2018 |
| Test & Evaluation: Developmental Flight Test: Developmental Test | 4 | 2018 | 1 | 2019 |
| Test & Evaluation: Developmental Flight Test: Opertational Flight Test | 2 | 2019 | 3 | 2019 |
| ***E-2D Counter Electronic Attack*** | | | | |
| System Development: Software Development DSSC 4: Counter Electronic Attack - SW Development | 1 | 2018 | 1 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| System Development: Software Development DSSC 4: Counter Electronic Attack - SIL Integration | 2 | 2018 | 4 | 2018 |
| System Development: Software Development DSSC 4: Counter Electronic Attack - TRR | 3 | 2018 | 3 | 2018 |
| System Development: Software Development DSSC 4: Counter Electronic Attack - FRR | 1 | 2019 | 1 | 2019 |
| System Development: Software Development DSSC 4: Counter Electronic Attack - Delta FRR | 2 | 2020 | 2 | 2020 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - Requirements Development | 3 | 2019 | 3 | 2020 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - HW/SW Development | 3 | 2020 | 4 | 2021 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - System Requirement Review | 2 | 2020 | 2 | 2020 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - Preliminary Design Review | 1 | 2021 | 1 | 2021 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - Critical Design Review | 4 | 2021 | 4 | 2021 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - Test Readiness Review | 2 | 2022 | 2 | 2022 |
| System Development: Requirement Development DSSC 5: Counter Electronic Attack - Functional Readiness Review | 1 | 2023 | 1 | 2023 |
| System Development: Requirement Development DSSC 6: Counter Electronic Attack - Requirements Development | 3 | 2023 | 3 | 2024 |
| System Development: Requirement Development DSSC 6: Counter Electronic Attack - System Requirement Review | 2 | 2024 | 2 | 2024 |
| System Development: Requirement Development DSSC 6: Counter Electronic Attack - HW/SW Development | 3 | 2024 | 4 | 2024 |
| Test & Evaluation DSSC: Developmental T&E DSSC 4: Counter Electronic Attack - DT&E | 2 | 2019 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation DSSC: Developmental T&E DSSC 5: Counter Electronic Attack - SIL Integration | 1 | 2022 | 1 | 2023 |
| Test & Evaluation DSSC: Developmental T&E DSSC 5: Counter Electronic Attack - DT&E | 2 | 2023 | 4 | 2023 |
| Test & Evaluation DSSC: DSSC Integration & Test: DSSC-4 Dev Test | 1 | 2021 | 3 | 2021 |
| Test & Evaluation DSSC: DSSC Integration & Test: DSSC-5 Dev Test | 2 | 2023 | 3 | 2023 |
| Test & Evaluation DSSC: DSSC Integration & Test: DSSC-4 Operational Test | 4 | 2021 | 2 | 2022 |
| Test & Evaluation DSSC: DSSC Integration & Test: DSSC-5 Operational Test | 1 | 2024 | 2 | 2024 |
| ***E-2D MIDS/JTRS Tactical Targeting Networking Technology (TTNT)*** | | | | |
| System Development & Design: TTNT HPA Development & Design: TTNT High Power Amplifier Critical Design Review | 4 | 2018 | 4 | 2018 |
| System Development & Design: TTNT HPA Development & Design: TTNT High Power Amplifier Test Readiness Review | 2 | 2019 | 2 | 2019 |
| System Development & Design: TTNT MIDS/JTRS TTNT Integration: TTNT - Critical Design Review | 3 | 2018 | 3 | 2018 |
| System Development & Design: TTNT MIDS/JTRS TTNT Integration: TTNT -Test Readiness Review | 1 | 2020 | 1 | 2020 |
| System Development & Design: TTNT MIDS/JTRS TTNT Integration: TTNT - Functional Readiness Review | 3 | 2020 | 3 | 2020 |
| System Development & Design: TTNT MIDS/JTRS TTNT Integration: TTNT - Production Readiness Review | 1 | 2021 | 1 | 2021 |
| Test & Evaluation: MIDS/JTRS TTNT Developmental Test/Operational Test: MIDS/ JTRS/TTNT - Developmental Test | 2 | 2020 | 3 | 2020 |
| Test & Evaluation: MIDS/JTRS TTNT Developmental Test/Operational Test: MIDS/ JTRS/TTNT - Developmental Test DSSC 4 | 1 | 2021 | 3 | 2021 |
| Test & Evaluation: MIDS/JTRS TTNT Developmental Test/Operational Test: MIDS/ JTRS/TTNT Operational Test DSSC 4 | 4 | 2021 | 2 | 2022 |
| ***E-2D SIPRChat*** | | | | |
| Acquisition Milestones: Milestones: SIPRChat - Critical Design Review | 1 | 2018 | 1 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Acquisition Milestones: Milestones: SIPRChat -Test Readiness Review | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: Milestones: SIPRChat - Functional Readiness Review | 1 | 2020 | 1 | 2020 |
| Test & Evaluation: Developmental Test/Operational Test: Developmental Test for DSSC-3.1 | 4 | 2019 | 1 | 2020 |
| Test & Evaluation: Developmental Test/Operational Test: Developmental Test | 1 | 2020 | 2 | 2020 |
| Test & Evaluation: Developmental Test/Operational Test: Developmental Test DSSC-3.1 | 4 | 2019 | 1 | 2020 |
| Test & Evaluation: Developmental Test/Operational Test: Developmental Test DSSC-4 | 1 | 2021 | 3 | 2021 |
| Test & Evaluation: Developmental Test/Operational Test: Operational Test DSSC-4 | 4 | 2021 | 2 | 2022 |
| ***Accelerated Mid-Term Interoperability Improvement Program (AMIIP)*** | | | | |
| Test & Evaluation: Technical Evaluation: Developmental Test DSSC-3 | 3 | 2018 | 4 | 2018 |
| Test & Evaluation: Technical Evaluation: Operational Test DSSC-3 | 2 | 2019 | 4 | 2019 |
| ***Sensor Netting (SN)*** | | | | |
| Acquisition Milestones: SN DSSC 4: System Requirements Review | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: SN DSSC 4: Preliminary Design Review | 1 | 2019 | 1 | 2019 |
| Acquisition Milestones: SN DSSC 4: Critical Design Review | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: SN DSSC 4: Test Readiness Review | 1 | 2020 | 1 | 2020 |
| Acquisition Milestones: SN DSSC 4: Functional Readiness Review | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: SN DSSC 5: System Requirements Review | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: SN DSSC 5: Integrated Baseline Review | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: SN DSSC 5: Preliminary Design Review | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: SN DSSC 5: Critical Design Review | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: SN DSSC 5: Test Readiness Review | 1 | 2021 | 1 | 2021 |
| Acquisition Milestones: SN DSSC 5: Functional Readiness Review | 4 | 2021 | 4 | 2021 |
| Development & Design: SW Development and Integrationn DSSC 4 | 4 | 2018 | 4 | 2019 |
| Development & Design: SW Development and Integration DSSC 5 | 1 | 2019 | 4 | 2021 |
| Test & Evaluaiton: SIL Test DSSC-4 | 1 | 2020 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluaiton: SIL Test DSSC- 5 | 1 | 2021 | 1 | 2022 |
| Test & Evaluaiton: Development Test SN DSSC-4 | 3 | 2020 | 4 | 2020 |
| Test & Evaluaiton: Developmental Test DSSC-4 | 1 | 2021 | 3 | 2021 |
| Test & Evaluaiton: Operational Test DSSC-4 | 4 | 2021 | 2 | 2022 |
| Test & Evaluaiton: Development Test DSSC-5 | 2 | 2023 | 3 | 2023 |
| Test & Evaluaiton: Operational Test DSSC-5 | 1 | 2024 | 2 | 2024 |
| ***Data Fusion Phase 1*** | | | | |
| System Requirements Review | 4 | 2018 | 4 | 2018 |
| Preliminary Design Review | 1 | 2019 | 1 | 2019 |
| Critical Design Review | 3 | 2019 | 3 | 2019 |
| Test Readiness Review | 2 | 2020 | 2 | 2020 |
| Functional Readiness Review | 3 | 2020 | 3 | 2020 |
| Data Fusion Phase 2: System Requirement Review | 2 | 2019 | 2 | 2019 |
| Data Fusion Phase 2: Preliminary Design Review | 4 | 2019 | 4 | 2019 |
| Data Fusion Phase 2: Critical Design Review | 3 | 2020 | 3 | 2020 |
| Data Fusion Phase 2: Test Readiness Review | 1 | 2021 | 1 | 2021 |
| Data Fusion Phase 2: Functional Readiness Review | 4 | 2021 | 4 | 2021 |
| Development & Design: Development & Integration Data Fusion Phase 1 | 1 | 2018 | 1 | 2019 |
| Development & Design: Development & Integration Data Fusion Phase 2 | 2 | 2019 | 4 | 2019 |
| Development & Design: Systems Engineering & Integration Data Fusion Phase 1 | 2 | 2019 | 2 | 2021 |
| Development & Design: System Engineering & Integration Data Fusion Phase 2 | 1 | 2020 | 4 | 2022 |
| Development & Design: SIL Test Data Fusion Phase 1 | 2 | 2020 | 3 | 2020 |
| Development & Design: Risk Reduction Interoperability Test | 3 | 2020 | 3 | 2020 |
| Development & Design: SIL Test Data Fusion Phase 2 | 4 | 2021 | 1 | 2022 |
| Test & Evaluation: Developmental Test - Data Fusion Phase 1 | 3 | 2020 | 4 | 2020 |
| Test & Evaluation: Developmental Test - Data Fusion Phase 2 | 4 | 2021 | 3 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: Developmental Test DSSC 4 (Data Fusion Phase 1) | 1 | 2021 | 3 | 2021 |
| Test & Evaluation: Operational Test DSSC 4 (Data Fusion Phase 1) | 4 | 2021 | 2 | 2022 |
| Test & Evaluation: Developmental Test DSSC 5 (Data Fusion Phase 2) | 2 | 2023 | 3 | 2023 |
| Test & Evaluation: Operational Test DSSC 5 (Data Fusion Phase 2) | 1 | 2024 | 2 | 2024 |
| ***NAVWAR*** | | | | |
| Acquisition Milestones: System Rquirements Review/System Functional Review | 2 | 2018 | 2 | 2018 |
| Acquisition Milestones: Preliminary Design Review/Critical Design Review | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Test Readiness Reivew/Functional Readiness Review | 1 | 2019 | 1 | 2019 |
| Development & Design: Systems Engineering & Integration | 1 | 2018 | 4 | 2018 |
| Development & Design: Hardware Development | 1 | 2018 | 2 | 2018 |
| Development & Design: Software Development | 2 | 2018 | 4 | 2018 |
| Development & Design: System Integration Lab Test | 4 | 2018 | 1 | 2019 |
| Test & Evaluation: Developmental Test | 2 | 2019 | 1 | 2020 |
| Test & Evaluation: Developmental Test DSSC-3.1 | 4 | 2019 | 1 | 2020 |
| ***SPARQ*** | | | | |
| Acquisition Milestones: System Requirements Review | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Integrated Baseline Review | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: Preliminary Design Review | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: Critical Design Review | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Test Readiness Review | 1 | 2021 | 1 | 2021 |
| Acquisition Milestones: Functional Readiness Review | 4 | 2021 | 4 | 2021 |
| Development & Design: Requirements Development | 1 | 2018 | 2 | 2019 |
| Development & Design: Software Development and Integration | 4 | 2018 | 3 | 2020 |
| Test & Evaluation: SIL Test | 4 | 2020 | 3 | 2021 |
| Test & Evaluation: Developmental Test | 3 | 2021 | 3 | 2022 |
| Test & Evaluation: Developmental Test DSSC-5 | 2 | 2023 | 3 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: Operational Test DSSC-5 | 1 | 2024 | 2 | 2024 |
| ***ALQ-217 Electronic Support Measures (ESM)/Survivability*** | | | | |
| Acquisition Milestones: ALQ-217 ESM: System Requirements Review 2 | 1 | 2019 | 1 | 2019 |
| Acquisition Milestones: ALQ-217 ESM: Preliminary Design Review | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: ALQ-217 ESM: Critical Design Review | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: ALQ-217 ESM: Functional Readiness Review | 4 | 2020 | 4 | 2020 |
| Acquisition Milestones: Survivability: System Requirements Review | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Survivability: Preliminary Design Review | 4 | 2020 | 4 | 2020 |
| Acquisition Milestones: Survivability: Critical Design Review | 4 | 2021 | 4 | 2021 |
| Acquisition Milestones: Survivability: Functional Readiness Review | 4 | 2022 | 4 | 2022 |
| Development & Design: ALQ-217 ESM: Requirements Development | 3 | 2018 | 2 | 2019 |
| Development & Design: ALQ-217 ESM: HW/SW Development & Integration | 2 | 2019 | 1 | 2023 |
| Development & Design: Survivability: Requirements Development | 1 | 2020 | 2 | 2021 |
| Development & Design: Survivability: HW/SW Development & Integration | 3 | 2021 | 4 | 2024 |
| Test & Evaluation: ALQ-217 ESM: ChamberTest 1 | 4 | 2020 | 4 | 2020 |
| Test & Evaluation: ALQ-217 ESM: Chamber Test 2 | 1 | 2021 | 1 | 2021 |
| Test & Evaluation: ALQ-217 ESM: Developmental Test | 2 | 2021 | 3 | 2022 |
| Test & Evaluation: Survivability: Chamber Test 3 | 1 | 2023 | 1 | 2023 |
| Test & Evaluation: Survivability: Chamber Test 4 | 2 | 2023 | 2 | 2023 |
| Test & Evaluation: Survivability: Developmental Test | 3 | 2023 | 3 | 2024 |
| Test & Evaluation: ALQ-217 ESM DSSC Integration Test: Developmental Test DSSC-5 | 2 | 2023 | 3 | 2023 |
| Test & Evaluation: ALQ-217 ESM DSSC Integration Test: Operational Test DSSC-5 | 1 | 2024 | 2 | 2024 |
| ***E-2D Crypto Modernization/Frequency Remapping*** | | | | |
| Acquisition Milestones: Critical Desing Review | 2 | 2018 | 2 | 2018 |
| Acquisition Milestones: Test Readiness Review | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: Functional Readiness Review | 4 | 2019 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>3051 / *E-2D Adv Hawkeye* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Development & Design: Requirements Development | 1 | 2018 | 3 | 2019 |
| Test & Evaluation: Developmental Test | 4 | 2019 | 1 | 2020 |
| Test & Evaluation: Developmental Test DSSC-3.1 | 4 | 2019 | 1 | 2020 |
| ***E-2D Theater Combat Identification (CID)*** | | | | |
| Acquisition Milestones: Integrated Baseline Review | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: System Requirement Review/System Functional Review | 2 | 2021 | 2 | 2021 |
| Acquisition Milestones: Preliminary Design Review | 3 | 2021 | 3 | 2021 |
| Acquisition Milestones: Critical Design Review | 3 | 2022 | 3 | 2022 |
| Development & Design: Requirements Development | 2 | 2020 | 2 | 2021 |
| Development & Design: Hardware/Software Development and Integration | 2 | 2021 | 4 | 2022 |
| Test & Evaluation: Developmental Test | 4 | 2022 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 17.879 | 9.657 | 12.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 39.536 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Congressional Add. Program Increase for E-2D Advanced Hawkeye(AHE) radar development

**A. Mission Description and Budget Item Justification**

Congressional Add. The E-2D Advanced Hawkeye and associated APY-9 radar meet the requirements specified in the Capabilities Development Document (CDD), including detection ranges, detection velocities, and tracking accuracies, verified through extensive developmental and operational flight testing and deployed operations. Program increase for E-2D advanced radar development to stay ahead of the evolving threat.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Radar Enhancements<br>***FY 2018 Accomplishments:*** Funding applied to research and development efforts to mature technologies in support of next generation radar and sensor systems.<br>***FY 2019 Plans:*** Continue research and development efforts to mature technologies in support of next generation radar and sensor systems. | 9.657 | 0.000 |
| ***Congressional Add:*** E-2D Hawkeye Advanced Radar<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** N/A | 0.000 | 12.000 |
| **Congressional Adds Subtotals** | 9.657 | 12.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Program increase to continue improving radar capability of the E-2D Hawkeye to stay ahead of the evolving threat. Planned investments in the E-2D, APY-9 radar and new antenna technology will continue to pace emerging threats.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**E. Performance Metrics**

HG-UESA technology shows great exceptional potential for future E-2D missions and the next generation Airborne Early Warning platform.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering | C/FFP | Northrop Grumman Corporation (NGC) : Melbourne, FL | 9.842 | 5.539 | Aug 2018 | 5.927 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 21.308 | 21.308 |
| System Engineering | Various | Various : Various | 6.921 | 1.411 | Sep 2018 | 2.100 | Jul 2019 | 0.000 | | - | | 0.000 | 0.000 | 10.432 | 10.432 |
| System Engineering | C/CPFF | Navy Syst Mgt Activity : Arlington VA | 0.000 | 2.707 | Aug 2018 | 2.000 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 4.707 | 4.707 |
| | | **Subtotal** | 16.763 | 9.657 | | 10.027 | | 0.000 | | - | | 0.000 | 0.000 | 36.447 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering | WR | SPAWAR : San Diego | 0.116 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.116 | - |
| Government Engineering | WR | NAWCAD : Pax River | 1.000 | 0.000 | | 0.498 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.498 | - |
| Software Development | C/CPFF | Navy Syst Mgt Activity : Arlington VA | 0.000 | 0.000 | | 1.068 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.068 | 1.068 |
| | | **Subtotal** | 1.116 | 0.000 | | 1.566 | | 0.000 | | - | | 0.000 | 0.000 | 2.682 | N/A |

**Test and Evaluation ($ in Millions)**

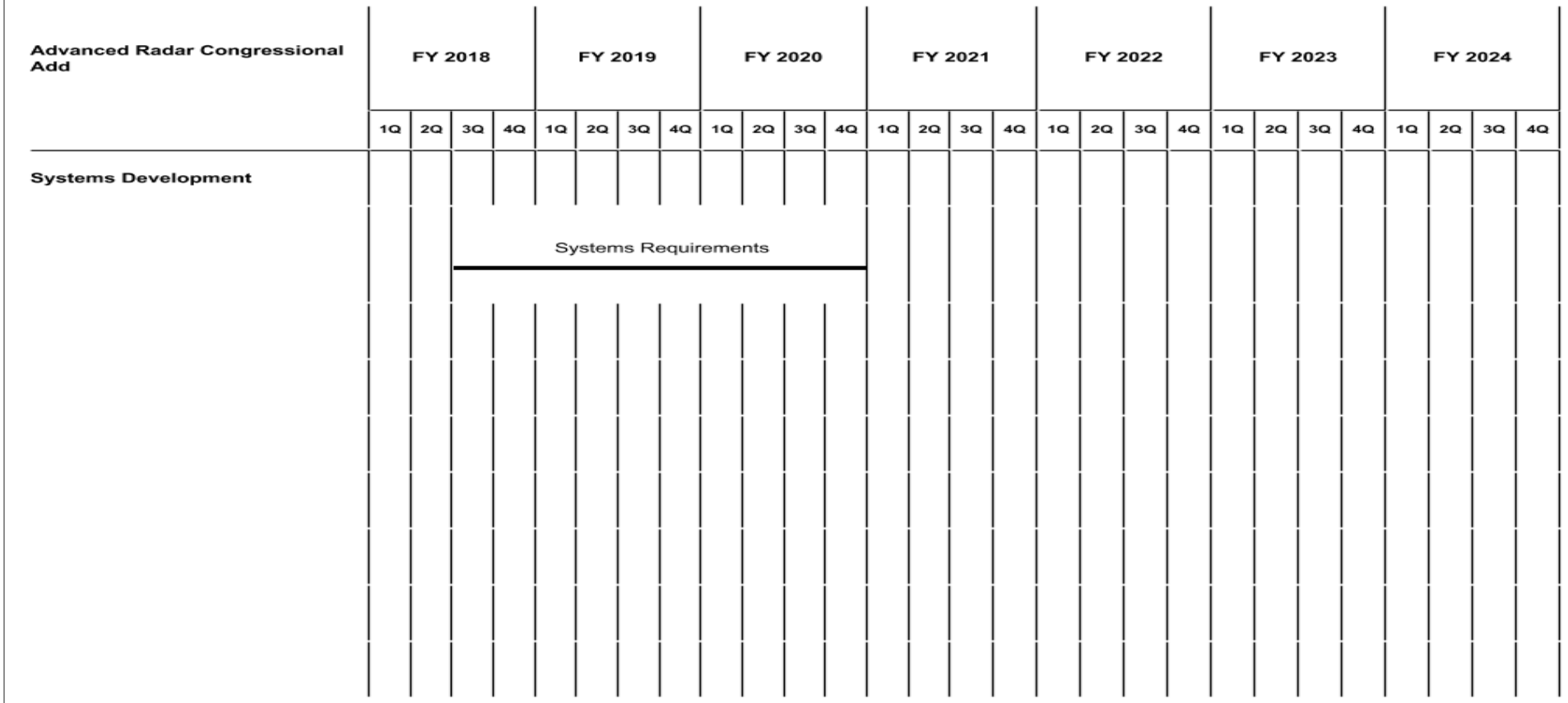
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T&E | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.407 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.407 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.407 | | 0.000 | | - | | 0.000 | 0.000 | 0.407 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604234N / *Advanced Hawkeye* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 17.879 | 9.657 | | 12.000 | | 0.000 | | - | | 0.000 | 0.000 | 39.536 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604234N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604234N / *Advanced Hawkeye* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Advanced Radar Congressional Add*** | | | | |
| Systems Development: Systems Requirements | 3 | 2018 | 4 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 0.000 | 54.320 | 65.359 | - | 65.359 | 77.151 | 59.678 | 38.691 | 14.459 | Continuing | Continuing |
| 3359: *H-1 Improvements* | 0.000 | 0.000 | 54.320 | 65.359 | - | 65.359 | 77.151 | 59.678 | 38.691 | 14.459 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The mission of the AH-1 attack helicopter is to provide rotary wing close air support, anti-armor, armed escort, armed/visual reconnaissance, survivability enhancements, and fire support coordination capabilities under day/night and adverse weather conditions. The mission of the UH-1 utility helicopter is to provide command and control and combat assault support under day/night and adverse weather conditions and special operations support; supporting arms coordination and aeromedical evacuation. Major modifications for both aircraft include 37 AH-1Ws converted to AH-1Zs, build 152 new AH-1Zs, remanufacture ten (10) H-1N helicopters and build 150 new UH-1Y models. AH-1Z and UH-1Y models include a 4-bladed, composite rotor system with semi-automatic bladefold, performance-matched transmissions, T700 Engine Digital Electronic Control Units, 4-bladed tail rotors and drive systems, more effective stabilizers, upgraded landing gear, and common, fully integrated cockpits and avionics systems. These upgrades add 10,000 flight hours to AH-1Z/UH-1Y airframes. The fully integrated cockpits reduce operator workload and improve situational awareness, thus increasing safety and reducing the rate of aircraft attrition. They provide considerable growth potential for future weapon systems and avionics to significantly increase mission effectiveness and survivability. The cockpits also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, air-to-ground missile and air-launched intercept missile weapon systems management in nearly identical crew stations, which significantly reduces training requirements. These upgrades maximize commonality between the two aircraft and provide needed improvements in crew and passenger survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

This budget is required for follow-on improvements to H-1 aircraft via integration of sensors and weapons, avionics, and air vehicle components that will address deficiencies, systems safety, obsolescence, readiness, reliability, supportability, and relevance in the battlespace. Improvements will include all associated System Configuration Set (SCS) updates as well as integration and testing related to the aircraft platforms.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal years.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604245M / *H-1 Upgrades* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 0.000 | 58.097 | 75.951 | - | 75.951 |
| Current President's Budget | 0.000 | 54.320 | 65.359 | - | 65.359 |
| Total Adjustments | 0.000 | -3.777 | -10.592 | - | -10.592 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -3.777 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | -10.600 | - | -10.600 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.008 | - | 0.008 |

**Change Summary Explanation**

FY 2019 includes a Congressional reduction of $3.777 million for unclear budget justification.

The FY 2020 funding request was reduced by $6.00 million to account for the availability of prior year execution balances.

The FY 2020 funding was reduced due to internal USMC re-prioritization of funding for higher priority service requirements.

Funds increase from FY2019 to FY2020 due to flight testing for Target Sight System Block Upgrade with Optimized TopOwl improvements, specifically to address Transfer Alignment for weapons employment and Degraded Visual Environment (DVE)options; to support airworthiness integration of the AIM-9X, Jettison Testing of the Intrepid Tiger (IT-IIV3); correction of software issues associated with the Brite STAR II Laser Spot Tracker (LST); and Distributed Aperture Infrared Countermeasures (DAIRCM) software testing for putting the system under glass.

Technical: None

Schedule: System Configuration Sets (SCS) will be continuously developed and released in conjunction with required hardware obsolescence and capability improvements. Software development as a whole are accounted for separately on the R-3 and are apportioned into development efforts for Avionics and Sensors & Weapons on the R-2a. Software is no longer portrayed separately on the R-2a or R-4 since SCS builds are linked to the development of hardware. The Mission Description section for Avionics and Sensors and Weapons state that SCS is part of each of the projects.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604245M / *H-1 Upgrades* | | | | Project (Number/Name)<br>3359 / *H-1 Improvements* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3359: *H-1 Improvements* | 0.000 | 0.000 | 54.320 | 65.359 | - | 65.359 | 77.151 | 59.678 | 38.691 | 14.459 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The objective of H-1 Improvements is to provide follow-on Research, Development, Test and Evaluation efforts in support of all H-1 aircraft.

Air Vehicle and Engine improvements include analysis of structural data to formulate Damage Limits and Tolerances for structural components to reduce life cycle costs and maintenance workload; and redesign of structural components and drive system components to minimize excessive and premature wear, increase reliability, and improve existing design deficiencies. Additional air vehicle upgrades include: redesign of the aircraft power-generating and electrical components (generators, inverters, wiring) to support power requirements for existing and future systems (Aircraft Survivability Equipment, emerging electronic warfare, and Degraded Visual Environment), redesign of the Environmental Control System /Thermal Redesign to support cooling of Technology Refresh Mission Computer and other avionics, redesign to add an auxiliary fuel capability, Intrepid Tiger, and upgrades the UH-1Y cabin floor panels.

Avionics improvements target digital inter-operability, integrated avionics, safety & survivability, and situational awareness for both the pilot and aircrew safety. This includes integrating Joint Battle Command-Platform (JBC-P), Full Motion Video (FMV), Degraded Visual Environment (DVE), Helmet Mounted Display improvements, cockpit displays, precision and GPS non-precision landing capability, Crash Survivable Flight Incident Recorder, collision avoidance, improved Embedded Global Positioning System (EGI), Inertial Navigation System (INS), targeting sensor systems and mission computer. H-1 capability improvements include improved Aircraft Survivability Equipment (ASE), digital operations & transfer of data, digital interoperability, digital video recording, video and data networking, and information integration with aviation combat elements and Marine Air Ground Task Force elements. Mandated capability efforts include - Communications, Navigation and Surveillance system/ Air Traffic Management (CNS/ATM), Required Navigation Performance/Area Navigation (RNP/RNAV), GPS Selective Availability Anti-Spoofing Module (SAASM), Automatic Dependent Surveillance - Broadcast (ADS-B), Crash Survivable Flight Incident Recorder, development efforts required for Depot standup and incorporation of technology and information protection/Information Assurance in critical avionics and sensor systems. In addition, the goal is to reduce total ownership cost for H-1 aircraft and related support systems by improving reliability and maintainability of critical flight and avionics systems along with associated peculiar avionics support equipment and incorporating fact-of-life obsolescence solutions. All avionics improvements include related System Configuration Set (SCS) development updates and testing.

Sensors, Weapons and Helmet Mounted Display System improvements include, manufacturing process improvements, hardware and software redesign to improve reliability, improve production methodologies, implement program security initiatives and increase the collective capability to address emerging battlefield threats. These improvements also address reliability and obsolescence, which collectively enhance Fleet readiness. The technical interface between the aircraft sensor, helmet and weapons is increasingly challenging to effectively employ advanced precision guided weapons and Aircraft Survivability Equipment (ASE) for the interface between the sensors, helmet and precision guided munitions. These systems require extensive software and hardware upgrades that translate into meaningful, sensor fusion based solutions, to provide both battlefield and situational awareness to the H1 platform. Specifically, the AN/ALQ-30 Target Sight System (TSS) will implement several block upgrade efforts with improvements to the IR Pointer, Laser and Cameras as well as adding capabilities such as Laser Spot Tracker and High Definition Video. The Optimized TopOwl (OTO) optics upgrades, reliability, additive manufacturing initiatives, will address multiple human factor improvements, to include Degraded

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

Visual Environment (DVE), as well as advanced boresighting and mapping improvements to improve weapons accuracy. The Digital Interoperability of the Helmet and Sensor will extend to improvements in ASE and Smart Dispense Technologies to improve aircraft survivability. Radar and Missile Warning improvements, including APR-39D(V)2 and the Distributed Aperture Infrared Countermeasures (DAIRCM), require extensive integration and testing. Development, test and integration efforts with the Advanced Precision Kill Weapons (APKWS), M299 Launcher improvements, Digital Rocket Launcher (DRL), AIM-9X, the AN/ALQ-231 (V) Intrepid Tiger II Electronic Warfare Pod and the Joint Air-to-Ground Missile (JAGM) Hellfire missile will follow in FY18. Improving and integrating weapon systems will align with these upgrades to improve the overall accuracy, lethality and survivability of the H1 platform.

These improvements will provide considerable growth potential for future weapon systems, air vehicle improvements, software improvements, and avionics upgrades, which will significantly increase mission effectiveness & survivability, while potentially reducing life cycle costs. The cockpits will also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, precision guided munitions, and air-launched intercept missile weapon systems management in nearly identical crew stations, which significantly reduce training requirements. These upgrades maximize commonality between all H-1 Type/Model/Series aircraft and provide needed improvements in crew and passenger reliability, survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Weapons and Sensors Testing and Integration | 0.000 | 7.648 | 17.354 | 0.000 | 17.354 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct prototype developmental testing of TSS Block Upgrade initiatives, to include software compatibility and high definition video feed to the Optimized Top Owl HMSD (Helmet Mounted Sight Display). Conduct HMSD optics testing, digital upgrades and Sensor/ASE interfaces. Continue enhanced digital capability efforts, Aircraft Survivability Equipment (ASE) improvements, Helmet Mounted Display improvements, with full visor integration and display enhancements, systems obsolescence mitigation efforts, as well as opportunities to improve support and test equipment modifications. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue prototype developmental testing of TSS Block Upgrade initiatives, to include software compatibility, transfer alignment corrections and high definition video feed to the Optimized Top Owl HMSD (Helmet Mounted Sight Display). Conduct HMSD optics testing, digital upgrades and Sensor/ASE interfaces, to include TopOwl integration of binocular optics. Continue enhanced digital capability efforts, Aircraft Survivability Equipment (ASE) improvements, Helmet Mounted Display improvements, with full visor integration and display enhancements, systems obsolescence mitigation efforts and test Degraded Visual Environment (DVE) solutions with TSS and OTO interfaces. Conduct testing and evaluation of Intrepid Tiger IT-IIV3 and Distributed Aperture Infrared Countermeasures. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding from FY 2019 to FY 2020 due to flight testing requirements for TSS Block Upgrade with OTO improvements, specifically to address Transfer Alignment for weapons employment and DVE options. Additionally, funds are required to support airworthiness integration of the AIM-9X, Jettison Testing of the Intrepid Tiger (IT-IIV3), and software improvements with the Brite STAR II LST and Distributed Aperture Infrared Countermeasures (DAIRCM). | | | | | |
| ***Title:*** Air Vehicle and Engines Improvements | 0.000 | 25.064 | 27.370 | 0.000 | 27.370 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue redesign of structural components to minimize excessive and premature wear, increase reliability, increase aircraft load capabilities, and improve existing design deficiencies. Continue redesign of the fuel system. Continue redesign of the aircraft electrical power-generating components and aircraft re-wiring to support power requirements for existing and future systems to include stores select-ability, future Avionics Survivability Equipment (ASE), emerging Electronic Warfare (EW), and Degraded Visual Environment (DVE) systems. Continue redesign of the Environmental Control Systems/Thermal to support other avionics on the UH-1Y/AH-1Z. Continue redesign of the drive system components (rotor brake/slip ring/standpipe/gearboxes/ drive shaft and couplers/chip detectors) to increase reliability and reduce high cost and/or failure rates. Continue upgrades and redesign of main and tail rotor blades. Continue survivability upgrades (canted forward chaff buckets, blast frag canopy, opaque armor, self-sealing fuel tanks, sump and backing board). Continue UH-1Y structural improvement program to increase capability including Intrepid Tiger, auxiliary fuel, cabin floor boards to prevent corrosion, floor panel access, and other structural reinforcements. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue redesign and initiate test of structural components to minimize excessive and premature wear, increase reliability, increase aircraft load capabilities, and improve existing design deficiencies including: the fuel system; the aircraft electrical power-generating components and aircraft re-wiring to support power requirements for existing and future systems to include stores select-ability, future Avionics Survivability Equipment (ASE), emerging Electronic Warfare (EW), and Degraded Visual Environment (DVE) systems; the Environmental Control Systems/Thermal to support other avionics on the UH-1Y/AH-1Z; the drive system components (rotor brake/slip ring/standpipe/gearboxes/drive shaft and couplers/chip detectors) to increase reliability and reduce high cost and/or failure rates; main and tail rotor blades including tail rotor mast. Continue survivability upgrades on canted forward chaff buckets, blast frag canopy, opaque armor, self-sealing fuel tanks, sump and backing | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| board. Continue UH-1Y structural improvements to increase capability including auxiliary fuel; cabin floor boards to prevent corrosion; floor panel access and other structural reinforcements. Initiate UH-1Y and AH-1Z structural improvements on composite elevator.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding from FY2019 to FY2020 due to increase in design and test efforts in support of UH-1Y/ AH-1Z structural improvement and reinforcement initiatives, component redesign efforts, and survivability upgrades. | | | | | |
| ***Title:*** Avionics Improvements<br>***Articles:***<br>***FY 2019 Plans:***<br>Continue with software integration, Development Testing (DT) and Validation and Verification (V&V) activities associated with SCS. Support software design changes associated with SCS in support of the new JAGM capability. Continue to support Avionics Test Facility (ATF). Initiate development of requirements and software architecture for SCS to include Aircraft Network Switch (ANS), Advanced Data Transfer System (ADTS), AIM-9X, Tactical Secure Voice, Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN), and Variable Message Format (VMF) Protocol for ARC-210 RT-1939A Radio. Complete development efforts on the Mission Computer (TRMC) redesign. Continue design, development and testing for digital interoperability improvements, additional waveform functionality, avionics components / systems obsolescence mitigation efforts, peculiar avionics support equipment, automatic test equipment and mission computer SCS improvements, Satellite Communications improvement, Full Motion Video, UH-1Y Aft Cabin Display for situational awareness, portable tablet Marine Air-Ground Task Force (MAGTF) improvements, digital interoperability application of Variable Message Formatting (VMF), Aircraft Dependent Surveillance Broadcast (ADS-B), and additional waveform functionality. Continue enhancement efforts digital capability efforts, digital map and data storage capabilities, digital video recording, display systems, digital interoperability, digital systems upgrades, avionics regression testing. Initiate design and development on TAWS, Wireless Intercommunication Systems (WICS), Joint Battlefield Command - Platform (JBC-P), Mobile User Objective System (MUOS) for over the horizon communication, Degraded Visual Environment and collision avoidance capability, Embedded Global Positioning System/Inertial Navigation System (EGI) upgrade for Selective | 0.000<br>- | 21.608<br>- | 20.635<br>- | 0.000<br>- | 20.635<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Availability Anti-Spoofing Module (SAASM), GPS non-precision approach capability and GPS signal protection efforts, Crash Survivable Flight Instrument Recorder (CSFIR), and Link tactical data exchange.<br>***FY 2020 Base Plans:***<br>Continue with software integration, Development Testing (DT) and Validation and Verification (V&V) activities associated with SCS. Support software design changes associated with SCS in support of JAGM and APR-39D(V)2. Continue to support Avionics Test Facility (ATF). Initiate development of requirements and software architecture for SCS to include Aircraft Network Switch (ANS), Advanced Data Transfer System (ADTS), AIM-9X, Tactical Secure Voice, Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN), and Variable Message Format (VMF) Protocol for ARC-210 RT-1939A Radio. Complete development efforts on the Mission Computer (TRMC) redesign. Continue design, development and testing for Digital Interoperability (DI) improvements, avionics components / systems obsolescence mitigation efforts, peculiar avionics support equipment, automatic test equipment and mission computer SCS improvements, Satellite Communications improvement, Link 16 development, Full Motion Video, UH-1Y Aft Cabin Display for situational awareness, portable tablet improvements for Marine Air-Ground Task Force, Aircraft Dependent Surveillance Broadcast (ADS-B), and waveform functionality. Continue enhancement of digital map and data storage capabilities, digital video recording, display systems, digital systems upgrades, avionics regression testing. Initiate design and development on TAWS, Wireless Intercommunication Systems (WICS), Joint Battlefield Command - Platform (JBC-P), Mobile User Objective System (MUOS) for over the horizon communication, Degraded Visual Environment and collision avoidance capability, Embedded Global Positioning System/Inertial Navigation System (EGI) upgrade for Selective Availability Anti-Spoofing Module (SAASM), GPS non-precision approach capability and GPS signal protection efforts, Crash Survivable Flight Instrument Recorder (CSFIR), and Link tactical data exchange.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease in funding from FY2019 to FY2020 due to reduction of hardware development, improvement, and integration efforts. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 54.320 | 65.359 | 0.000 | 65.359 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0178: *UH-1Y/AH-1Z APN1* | 938.961 | 840.437 | 62.003 | - | 62.003 | 7.353 | 7.538 | 7.656 | 7.795 | 0.000 | 10,666.714 |
| • APN/0178C: *UH-1Y/AH-1Z APN1 Advance Procurement* | 42.082 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 500.478 |

**Remarks**

**D. Acquisition Strategy**

Follow-on H-1 Improvements will be developed using cost plus fixed fee type contracts.

**E. Performance Metrics**

Continue hardware and software development and test for follow-on H-1 Improvements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604245M / *H-1 Upgrades* | Project (Number/Name)<br>3359 / *H-1 Improvements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | SS/CPFF | BHTI : Amarillo, TX | 0.000 | 0.000 | | 17.051 | Jan 2019 | 15.172 | Jan 2020 | - | | 15.172 | 37.939 | 70.162 | 70.162 |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.685 | Nov 2018 | 1.094 | Nov 2019 | - | | 1.094 | 3.774 | 5.553 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 17.736 | | 16.266 | | - | | 16.266 | 41.713 | 75.715 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | SS/CPFF | BHTI : Amarillo, TX | 0.000 | 0.000 | | 2.493 | Feb 2019 | 2.153 | Feb 2020 | - | | 2.153 | 5.038 | 9.684 | 9.684 |
| Software Development | SS/FP | Northrup Grumman : Woodland Hills, CA | 0.000 | 0.000 | | 7.935 | Nov 2018 | 12.999 | Nov 2019 | - | | 12.999 | 32.388 | 53.322 | 53.322 |
| Software Development | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 3.566 | Nov 2018 | 5.555 | Nov 2019 | - | | 5.555 | 12.309 | 21.430 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 13.994 | | 20.707 | | - | | 20.707 | 49.735 | 84.436 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 0.000 | 0.000 | | 1.988 | Nov 2018 | 2.773 | Nov 2019 | - | | 2.773 | 7.295 | 12.056 | - |
| Development Test and Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 19.319 | Nov 2018 | 23.872 | Nov 2019 | - | | 23.872 | 79.778 | 122.969 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 21.307 | | 26.645 | | - | | 26.645 | 87.073 | 135.025 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604245M / *H-1 Upgrades* | Project (Number/Name)<br>3359 / *H-1 Improvements* |

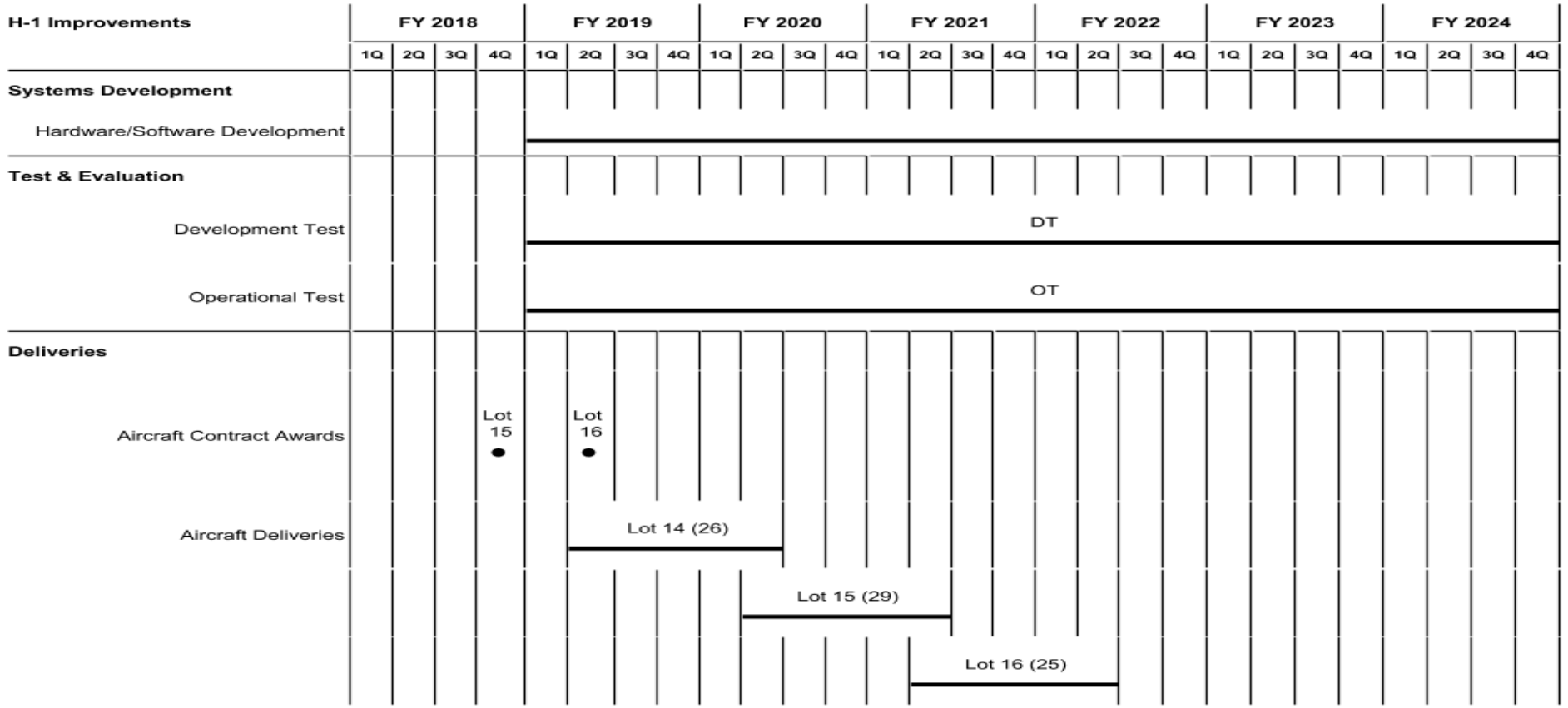
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | Various | Various : Various | 0.000 | 0.000 | | 0.338 | Nov 2018 | 0.314 | Nov 2019 | - | | 0.314 | 1.408 | 2.060 | 2.060 |
| Program Management Support | Various | Various : Various | 0.000 | 0.000 | | 0.703 | Nov 2018 | 1.202 | Nov 2019 | - | | 1.202 | 3.523 | 5.428 | - |
| Travel | WR | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.242 | Oct 2018 | 0.225 | Oct 2019 | - | | 0.225 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 1.283 | | 1.741 | | - | | 1.741 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 54.320 | | 65.359 | | - | | 65.359 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |




*2020PB - 0604245M - 3359*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245M / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***H-1 Improvements*** | | | | |
| Systems Development: Hardware/Software Development: Schedule Detail | 1 | 2019 | 4 | 2024 |
| Test & Evaluation: Development Test: H-1 Improvements DT | 1 | 2019 | 4 | 2024 |
| Test & Evaluation: Operational Test: H-1 Improvements OT | 1 | 2019 | 4 | 2024 |
| Deliveries: Aircraft Contract Awards: Lot 15 | 4 | 2018 | 4 | 2018 |
| Deliveries: Aircraft Contract Awards: Lot 16 | 2 | 2019 | 2 | 2019 |
| Deliveries: Aircraft Deliveries: Lot 14 FRP Z | 2 | 2019 | 2 | 2020 |
| Deliveries: Aircraft Deliveries: Lot 15 FRP Z | 2 | 2020 | 2 | 2021 |
| Deliveries: Aircraft Deliveries: Lot 16 FRP Z | 2 | 2021 | 2 | 2022 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604245N *I H-1 Upgrades* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 146.244 | 59.806 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 206.050 |
| 3359: *H-1 Improvements* | 146.244 | 59.806 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 206.050 |

**A. Mission Description and Budget Item Justification**

The mission of the AH-1 attack helicopter is to provide rotary wing close air support, anti-armor, armed escort, armed/visual reconnaissance, survivability enhancements, and fire support coordination capabilities under day/night and adverse weather conditions. The mission of the UH-1 utility helicopter is to provide command and control and combat assault support under day/night and adverse weather conditions and special operations support; supporting arms coordination and aeromedical evacuation. Major modifications for both aircraft include 37 AH-1Ws converted to AH-1Zs, build 152 new AH-1Zs, remanufacture ten (10) H-1N helicopters and build 150 new UH-1Y models. AH-1Z and UH-1Y models include a 4-bladed, composite rotor system with semi-automatic bladefold, performance-matched transmissions, T700 Engine Digital Electronic Control Units, 4-bladed tail rotors and drive systems, more effective stabilizers, upgraded landing gear, and common, fully integrated cockpits and avionics systems. These upgrades add 10,000 flight hours to AH-1Z/UH-1Y airframes. The fully integrated cockpits reduce operator workload and improve situational awareness, thus increasing safety and reducing the rate of aircraft attrition. They provide considerable growth potential for future weapon systems and avionics to significantly increase mission effectiveness and survivability. The cockpits also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, air-to-ground missile and air-launched intercept missile weapon systems management in nearly identical crew stations, which significantly reduces training requirements. These upgrades maximize commonality between the two aircraft and provide needed improvements in crew and passenger survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

This budget is required for follow-on improvements to H-1 aircraft via integration of sensors and weapons, avionics, and air vehicle components that will address deficiencies, systems safety, obsolescence, readiness, reliability, supportability, and relevance in the battlespace. Improvements will include all associated System Configuration Set (SCS) updates as well as integration and testing related to the aircraft platforms.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 61.288 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 59.806 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -1.482 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.482 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604245N *I H-1 Upgrades* |

**Change Summary Explanation**

Funds decrease from FY 2018 to FY 2019 due to transfer of effort to new PE 0604245M beginning in FY 2019.

Technical: None

Schedule: System Configuration Sets (SCS) will be continuously developed and released in conjunction with required hardware obsolescence and capability improvements. Software development as a whole are accounted for separately on the R-3 and are apportioned into development efforts for Avionics and Sensors & Weapons on the R-2a. Software is no longer portrayed separately on the R-2a or R-4 since SCS builds are linked to the development of hardware. The Mission Description section for Avionics and Sensors and Weapons state that SCS is part of each of the projects.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604245N / *H-1 Upgrades* | | | | Project (Number/Name)<br>3359 / *H-1 Improvements* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3359: *H-1 Improvements* | 146.244 | 59.806 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 206.050 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The objective of H-1 Improvements is to provide follow-on Research, Development, Test and Evaluation efforts in support of all H-1 aircraft.

Air Vehicle and Engine improvements include analysis of structural data to formulate Damage Limits and Tolerances for structural components to reduce life cycle costs and maintenance workload; and redesign of structural components and drive system components to minimize excessive and premature wear, increase reliability, and improve existing design deficiencies. Additional air vehicle upgrades include: redesign of the aircraft power-generating and electrical components (generators, inverters, wiring) to support power requirements for existing and future systems (Aircraft Survivability Equipment, emerging electronic warfare, and Degraded Visual Environment), redesign of the Environmental Control System /Thermal Redesign to support cooling of Technology Refresh Mission Computer and other avionics, redesign to add an auxiliary fuel capability, Intrepid Tiger, and upgrades the UH-1Y cabin floor panels.

Avionics improvements target digital inter-operability, integrated avionics, safety & survivability, and situational awareness for both the pilot and aircrew safety. This includes integrating Joint Battle Command-Platform (JBC-P), Full Motion Video (FMV), Degraded Visual Environment (DVE), Helmet Mounted Display improvements, cockpit displays, precision and GPS non-precision landing capability, Crash Survivable Flight Incident Recorder, collision avoidance, improved Embedded Global Positioning System (EGI), Inertial Navigation System (INS), targeting sensor systems and mission computer. H-1 capability improvements include improved Aircraft Survivability Equipment (ASE), digital operations & transfer of data, digital interoperability, digital video recording, video and data networking, and information integration with aviation combat elements and Marine Air Ground Task Force elements. Mandated capability efforts include - Communications, Navigation and Surveillance system/ Air Traffic Management (CNS/ATM), Required Navigation Performance/Area Navigation (RNP/RNAV), GPS Selective Availability Anti-Spoofing Module (SAASM), Automatic Dependent Surveillance - Broadcast (ADS-B), Crash Survivable Flight Incident Recorder, development efforts required for Depot standup and incorporation of technology and information protection/Information Assurance in critical avionics and sensor systems. In addition, the goal is to reduce total ownership cost for H-1 aircraft and related support systems by improving reliability and maintainability of critical flight and avionics systems along with associated peculiar avionics support equipment and incorporating fact-of-life obsolescence solutions. All avionics improvements include related System Configuration Set (SCS) development updates and testing.

Sensors, Weapons and Helmet Mounted Display System improvements include, manufacturing process improvements, hardware and software redesign to improve reliability, improve production methodologies, implement program security initiatives and increase the collective capability to address emerging battlefield threats. These improvements also address reliability and obsolescence, which collectively enhance Fleet readiness. The technical interface between the aircraft sensor, helmet and weapons is increasingly challenging to effectively employ advanced precision guided weapons and Aircraft Survivability Equipment (ASE) for the interface between the sensors, helmet and precision guided munitions. These systems require extensive software and hardware upgrades that translate into meaningful, sensor fusion based solutions, to provide both battlefield and situational awareness to the H1 platform. Specifically, the AN/ALQ-30 Target Sight System (TSS) will implement several block upgrade efforts with improvements to the IR Pointer, Laser and Cameras as well as adding capabilities such as Laser Spot Tracker and High Definition Video. The Optimized TopOwl (OTO) optics upgrades, reliability, additive manufacturing initiatives, will address multiple human factor improvements, to include Degraded

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245N / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

Visual Environment (DVE), as well as advanced boresighting and mapping improvements to improve weapons accuracy. The Digital Interoperability of the Helmet and Sensor will extend to improvements in ASE and Smart Dispense Technologies to improve aircraft survivability. Radar and Missile Warning improvements, including APR-39D(V)2 and the Distributed Aperture Infrared Countermeasures (DAIRCM), require extensive integration and testing. Development, test and integration efforts with the Advanced Precision Kill Weapons (APKWS), M299 Launcher improvements, Digital Rocket Launcher (DRL), AIM-9X, the AN/ALQ-231 (V) Intrepid Tiger II Electronic Warfare Pod and the Joint Air-to-Ground Missile (JAGM) Hellfire missile will follow in FY18. Improving and integrating weapon systems will align with these upgrades to improve the overall accuracy, lethality and survivability of the H1 platform.

These improvements will provide considerable growth potential for future weapon systems, air vehicle improvements, software improvements, and avionics upgrades, which will significantly increase mission effectiveness & survivability, while potentially reducing life cycle costs. The cockpits will also include integration of onboard mission planning, communications, digital fire control, self-navigation, night navigation/targeting, precision guided munitions, and air-launched intercept missile weapon systems management in nearly identical crew stations, which significantly reduce training requirements. These upgrades maximize commonality between all H-1 Type/Model/Series aircraft and provide needed improvements in crew and passenger reliability, survivability, payload, power available, endurance, range, airspeed, maneuverability and supportability.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Weapons and Sensors Testing and Integration | 7.381 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** Air Vehicle and Engines Improvements | 31.093 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245N / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** Avionics Improvements | 21.332 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 59.806 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0178: *UH-1Y/AH-1Z APN1* | 938.961 | 840.437 | 62.003 | - | 62.003 | 7.353 | 7.538 | 7.656 | 7.795 | 0.000 | 10,666.714 |
| • APN/0178C: *UH-1Y/AH-1Z APN1 Advance Procurement* | 42.082 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 500.478 |

**Remarks**

**D. Acquisition Strategy**

Follow-on H-1 Improvements will be developed using cost plus fixed fee type contracts.

**E. Performance Metrics**

Continue hardware and software development and test for follow-on H-1 Improvements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604245N / *H-1 Upgrades* | Project (Number/Name)<br>3359 / *H-1 Improvements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | SS/CPFF | BHTI : Amarillo, TX | 22.149 | 21.266 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 43.415 | 43.415 |
| Primary Hardware Development | SS/CPFF | Northrup Grumman : Woodland Hills, CA | 2.714 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.714 | 2.714 |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 2.954 | 0.677 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.631 | - |
| | | **Subtotal** | 27.817 | 21.943 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 49.760 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | SS/CPFF | BHTI : Amarillo, TX | 24.831 | 9.131 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.962 | 33.962 |
| Software Development | SS/FP | Northrup Grumman : Woodland Hills, CA | 8.004 | 1.882 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.886 | 9.886 |
| Software Development | WR | NAWCWD : China Lake, CA | 30.113 | 3.523 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.636 | - |
| | | **Subtotal** | 62.948 | 14.536 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 77.484 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 7.400 | 2.953 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.353 | - |
| Development Test and Evaluation | WR | NAWCAD : Patuxent River, MD | 42.709 | 19.105 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 61.814 | - |
| | | **Subtotal** | 50.109 | 22.058 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 72.167 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245N / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

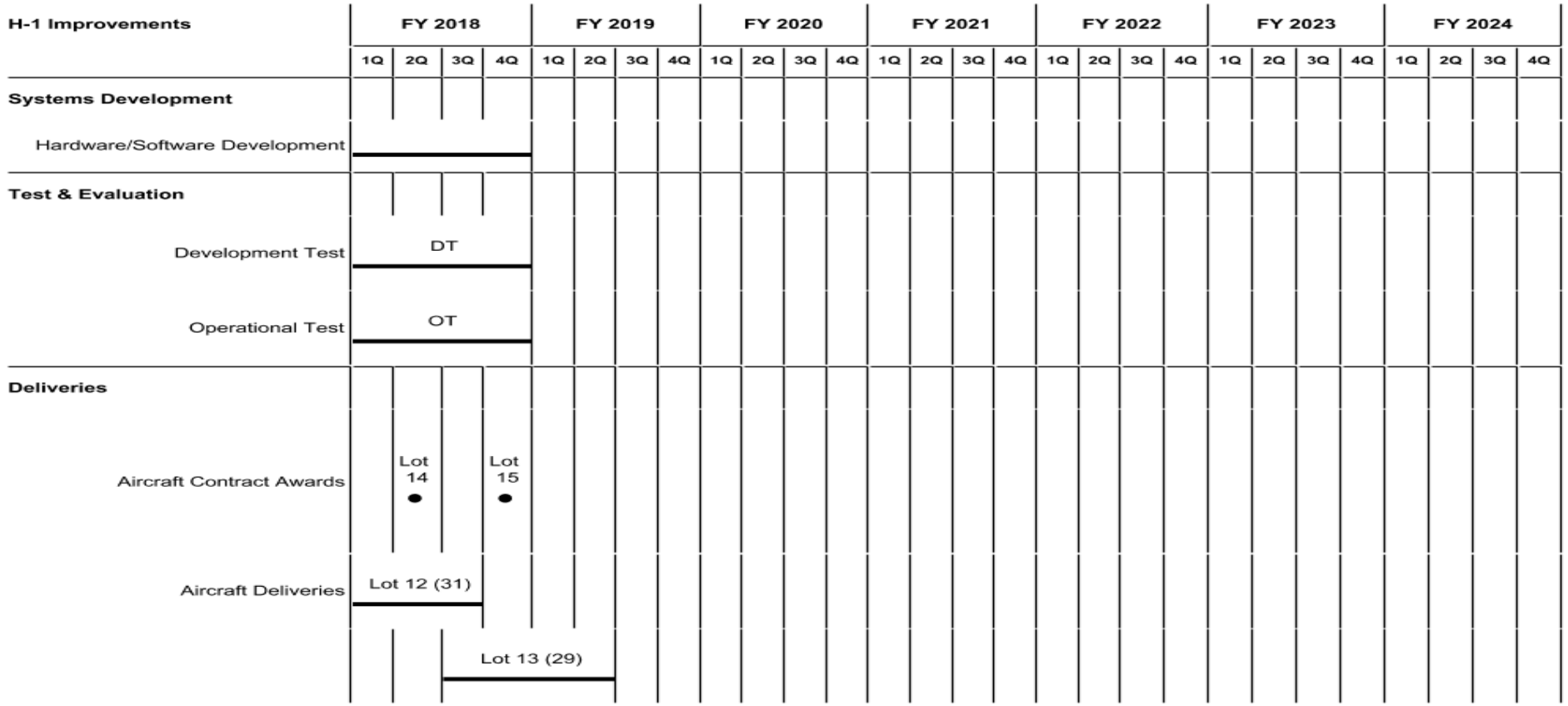
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | Various | Various : Various | 1.296 | 0.334 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.630 | 1.630 |
| Program Management Support | Various | Various : Various | 3.192 | 0.695 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.887 | - |
| Travel | WR | NAVAIR : Patuxent River, MD | 0.882 | 0.240 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.122 | - |
| | | **Subtotal** | 5.370 | 1.269 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.639 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 146.244 | 59.806 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 206.050 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245N / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |




*2020PB - 0604245N - 3359*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604245N / *H-1 Upgrades* | **Project (Number/Name)**<br>3359 / *H-1 Improvements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***H-1 Improvements*** | | | | |
| Systems Development: Hardware/Software Development: Schedule Detail | 1 | 2018 | 4 | 2018 |
| Test & Evaluation: Development Test: H-1 Improvements DT | 1 | 2018 | 4 | 2018 |
| Test & Evaluation: Operational Test: H-1 Improvements OT | 1 | 2018 | 4 | 2018 |
| Deliveries: Aircraft Contract Awards: Lot 14 | 2 | 2018 | 2 | 2018 |
| Deliveries: Aircraft Contract Awards: Lot 15 | 4 | 2018 | 4 | 2018 |
| Deliveries: Aircraft Deliveries: Lot 12 FRP Y + Z | 1 | 2018 | 3 | 2018 |
| Deliveries: Aircraft Deliveries: Lot 13 FRP Y + Z | 3 | 2018 | 2 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604261N *I Acoustic Search Sensors* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 515.845 | 36.310 | 42.485 | 47.013 | - | 47.013 | 47.883 | 48.843 | 49.802 | 50.797 | Continuing | Continuing |
| 0480: *ASW Sensors & Proc* | 398.306 | 32.686 | 38.599 | 43.045 | - | 43.045 | 43.837 | 44.717 | 45.594 | 46.505 | Continuing | Continuing |
| 3224: *High Altitude ASW* | 117.539 | 3.624 | 3.886 | 3.968 | - | 3.968 | 4.046 | 4.126 | 4.208 | 4.292 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

Includes RDT&E funds for engineering development and operational test and evaluation of acoustic search sensors/systems and complementary equipment for Anti-Submarine Warfare (ASW) aircraft.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 37.167 | 42.485 | 47.083 | - | 47.083 |
| Current President's Budget | 36.310 | 42.485 | 47.013 | - | 47.013 |
| Total Adjustments | -0.857 | 0.000 | -0.070 | - | -0.070 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.857 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.070 | - | -0.070 |

**Change Summary Explanation**

Funding: Funds Multi-Static Active Coherent Enhancements (MAC-E) development.

Technical: Not applicable.

Schedule:

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604261N *I Acoustic Search Sensors* |

0480 Schedule 1. The updated schedule adds more detail to the system development category to depict the test, analyze, fix, test relationship between data collection, software development and integration activities for MAC-E and Next Gen MAC-E. Next Gen MAC-E data collection and analysis and initial software development activities moved left from FY2022 into FY2021.

0480 Schedule 2. Not applicable.

0480 Schedule 3. Not applicable.

3224 Schedule. Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604261N / *Acoustic Search Sensors* | Project (Number/Name)<br>0480 / *ASW Sensors & Proc* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0480: *ASW Sensors & Proc* | 398.306 | 32.686 | 38.599 | 43.045 | - | 43.045 | 43.837 | 44.717 | 45.594 | 46.505 | Continuing | Continuing |
| Quantity of RDT&E Articles | | 75 | 100 | 125 | - | 125 | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Anti-Submarine Warfare (ASW) Sensors and Processing project provides the tools and methods necessary to maintain naval superiority by preventing threat submarines from disrupting the U.S. Navy's ability to control the sea lines of communication and completing their hostile missions. This project encompasses the Engineering & Manufacturing Development phase and the follow on Production and Deployment Phase of sensor systems to improve the mission effectiveness of airborne ASW platforms in cueing, searching, localizing, tracking, and attacking subsurface targets. Smaller and quieter threat submarines drive the requirement for continued advancement in ASW sensor capabilities for both blue water and littoral environments. The littoral regions of the world create an additional ASW challenge to overcome the increase in background clutter caused by the shallow water depth, high volume of shipping, and commercial radio frequency interference. Project 0480 provides funding to the passive and active ASW family of systems for the engineering development of solutions that detect, classify, and track threat submarines. The Multi-Static Active Coherent (MAC) program encompasses modifications to the active coherent (electronic) source sonobuoy and the Air Deployable Active Receiver sonobuoy and development, integration, and test of aircraft software. It also provides upgrades to the Multi-static mission planning tool, the tactical crew trainers and the tactical ground replay system. This program includes MAC Enhancements (MAC-E) that will shorten the ASW kill chain by enabling the warfighter to search larger areas in less time with more precision.

Project 0480 also provides funding for the Advanced Product Build (APB) program which integrates Office of Naval Research (ONR) Future Naval Capabilities (FNCs), Small Business Innovation Research (SBIR), University Affiliated Research Center (UARC) and other mature technologies into the processing baseline. Efforts incorporate clutter reduction, automation, improved displays and controls, as well as improved communication links resulting in reduced operator workload, increased target detection opportunities, and improved classification techniques. APB also includes an Air ASW Engineering Measurement Program (AEMP) that collects ASW operational system performance data and identifies areas where beneficial improvements can be incorporated across all Air ASW platforms. APB will deliver a new software build nominally in two year increments following MAC-E. The sonobuoy test articles in FY18-FY24 will support software and hardware integration flight tests and Technical Evaluation/Follow-On Test & Evaluation for the MAC program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** APB System Qualification Test/Fleet Release for P-3C. Rapid Capability Insertion (RCI)/Fleet Release for P-8A | 10.686 | 11.391 | 12.807 | 0.000 | 12.807 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue software development/EMP for P-8A RCI (2). Continue MAC FITs for P-8A squadrons. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>0480 / *ASW Sensors & Proc* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue software development/EMP for P-8A RCI (2). Continue MAC FITs for P-8A squadrons.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY20 increase funds the continued software development/EMP. | | | | | |
| ***Title:*** Multi-static Active Coherent (MAC) | 22.000 | 27.208 | 30.238 | 0.000 | 30.238 |
| ***Articles:*** | 75 | 100 | 125 | - | 125 |
| ***FY 2019 Plans:***<br>Continue MAC-E software development. Deliver SSQ-125A PRM units. Conduct SSQ-125A/MAC-E development test.<br>***FY 2020 Base Plans:***<br>Continue MAC-E software development/integration into the P-8A ECP-7 aircraft software. MAC-E software includes, but is not limited to: MAC-E/ADAR Controller, Likelihood Ratio Tracker, Atlantis, and Active System Performance Estimate Computer Tool. Conduct MAC-E/SSQ-125A development tests.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY20 increase funds the ramp-up of INC 3 MAC-E acoustics development/integration efforts and MAC-E test and evaluation. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 32.686 | 38.599 | 43.045 | 0.000 | 43.045 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4048: *Sonobuoys - AN/SSQ-125 (Multistatic Coherent Source)* | 41.752 | 70.363 | 77.882 | 0.943 | 78.825 | 85.045 | 82.601 | 87.084 | 87.104 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>0480 / *ASW Sensors & Proc* |

**D. Acquisition Strategy**

The Multistatic Active Coherent (MAC) ASW system and associated sonobuoys are fully integrated on the P-3C and P-8A ASW platforms. MAC Enhancements (MAC-E) is a development program associated with P-8A increment 3 that will significantly increase the wide area search capability through Engineering Change Proposals (ECPs) to the sonobuoys, aircraft software modifications to reduce clutter and improve processing, and OMI improvements to reduce operator workload. S&T and early R&D ASW improvement programs are matured through the APB process for periodic Fleet software releases.

**E. Performance Metrics**

High level operational system requirements are documented in the MAC Capability Production Document (CPD). Cost, schedule, and performance metrics are tracked throughout the development phase of the program to ensure the operational requirements will be met or exceeded during an extensive DT/OT cycle.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604261N / *Acoustic Search Sensors* | Project (Number/Name)<br>0480 / *ASW Sensors & Proc* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Development | SS/CPIF | ERAPSCO : FT. WAYNE IN | 21.208 | 3.592 | Dec 2017 | 2.047 | Dec 2018 | 0.000 | | - | | 0.000 | 17.500 | 44.347 | 44.347 |
| Prior year Prod Dev no longer funded in the FYDP | Various | VARIOUS : VARIOUS | 19.905 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development | C/CPIF | Boeing : Huntington Beach, CA | 0.000 | 0.000 | | 11.008 | Dec 2018 | 14.452 | Dec 2019 | - | | 14.452 | 0.000 | 25.460 | 25.460 |
| Software Development | WR | NAWCAD : PATUXENT RIVER, MD | 30.740 | 6.068 | Dec 2017 | 5.553 | Dec 2018 | 6.036 | Dec 2019 | - | | 6.036 | Continuing | Continuing | Continuing |
| Software Development | SS/CPIF | LOCKHEED MARTIN : MANASSAS VA | 11.702 | 1.870 | Dec 2017 | 1.750 | Dec 2018 | 2.500 | Dec 2019 | - | | 2.500 | 3.727 | 21.549 | 21.549 |
| Software Development | Various | VARIOUS : VARIOUS | 21.442 | 7.753 | Dec 2017 | 6.750 | Dec 2018 | 7.330 | Dec 2019 | - | | 7.330 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 104.997 | 19.283 | | 27.108 | | 30.318 | | - | | 30.318 | Continuing | Continuing | N/A |

**Remarks**

The FY20 increase funds the ramp-up of INC 3 MAC-E acoustics development/integration efforts.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Studies & Analysis | WR | NAWCAD : PATUXENT RIVER, MD | 20.073 | 2.070 | Dec 2017 | 1.979 | Dec 2018 | 2.156 | Dec 2019 | - | | 2.156 | Continuing | Continuing | Continuing |
| Technical Data | WR | NAWCAD : PATUXENT RIVER, MD | 16.374 | 0.337 | Dec 2017 | 0.350 | Dec 2018 | 0.431 | Dec 2019 | - | | 0.431 | Continuing | Continuing | Continuing |
| Training | WR | NAWCAD : PATUXENT RIVER, MD | 4.209 | 2.360 | Dec 2017 | 2.528 | Dec 2018 | 2.587 | Dec 2019 | - | | 2.587 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 40.656 | 4.767 | | 4.857 | | 5.174 | | - | | 5.174 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604261N / *Acoustic Search Sensors* | Project (Number/Name)<br>0480 / *ASW Sensors & Proc* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Eval | WR | NAWCAD : PATUXENT RIVER, MD | 32.303 | 3.689 | Dec 2017 | 3.050 | Dec 2018 | 3.506 | Dec 2019 | - | | 3.506 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 32.303 | 3.689 | | 3.050 | | 3.506 | | - | | 3.506 | Continuing | Continuing | N/A |

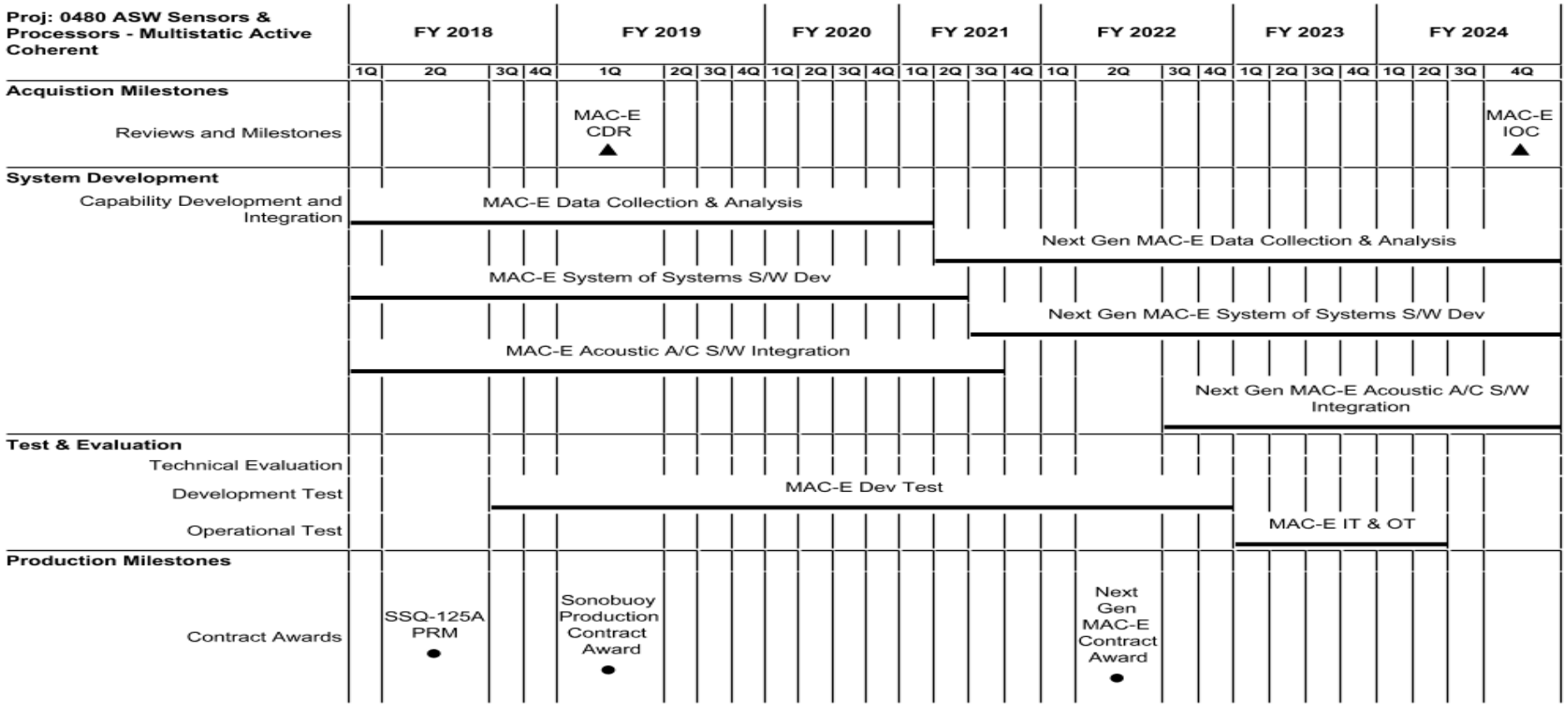
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Eng Spt | Various | VARIOUS : VARIOUS | 44.609 | 2.050 | Dec 2017 | 1.275 | Dec 2018 | 1.293 | Dec 2019 | - | | 1.293 | Continuing | Continuing | Continuing |
| Contractor Eng Spt | C/CPFF | NAVMAR APPLIED SCIENCES CORP : WARMINSTER, PA | 7.579 | 1.011 | Dec 2017 | 1.000 | Dec 2018 | 1.173 | Dec 2019 | - | | 1.173 | 2.810 | 13.573 | 13.573 |
| Government Eng Spt | WR | NAWCAD : PATUXENT RIVER, MD | 98.482 | 0.386 | Dec 2017 | 0.300 | Dec 2018 | 0.380 | Dec 2019 | - | | 0.380 | Continuing | Continuing | Continuing |
| Eng & Tech Spt Srvc (NON-FFRDC) | Various | VARIOUS : VARIOUS | 58.794 | 1.500 | Dec 2017 | 1.009 | Dec 2018 | 1.201 | Dec 2019 | - | | 1.201 | Continuing | Continuing | Continuing |
| Mgt & Prof SptT Srvc (FFRDC) | Various | VARIOUS : VARIOUS | 10.018 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Prior Years Mgmt Svcs no longer funded in the FYDP | Various | VARIOUS : VARIOUS | 0.868 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.868 | 0.868 |
| | | **Subtotal** | 220.350 | 4.947 | | 3.584 | | 4.047 | | - | | 4.047 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 398.306 | 32.686 | | 38.599 | | 43.045 | | - | | 43.045 | Continuing | Continuing | N/A |

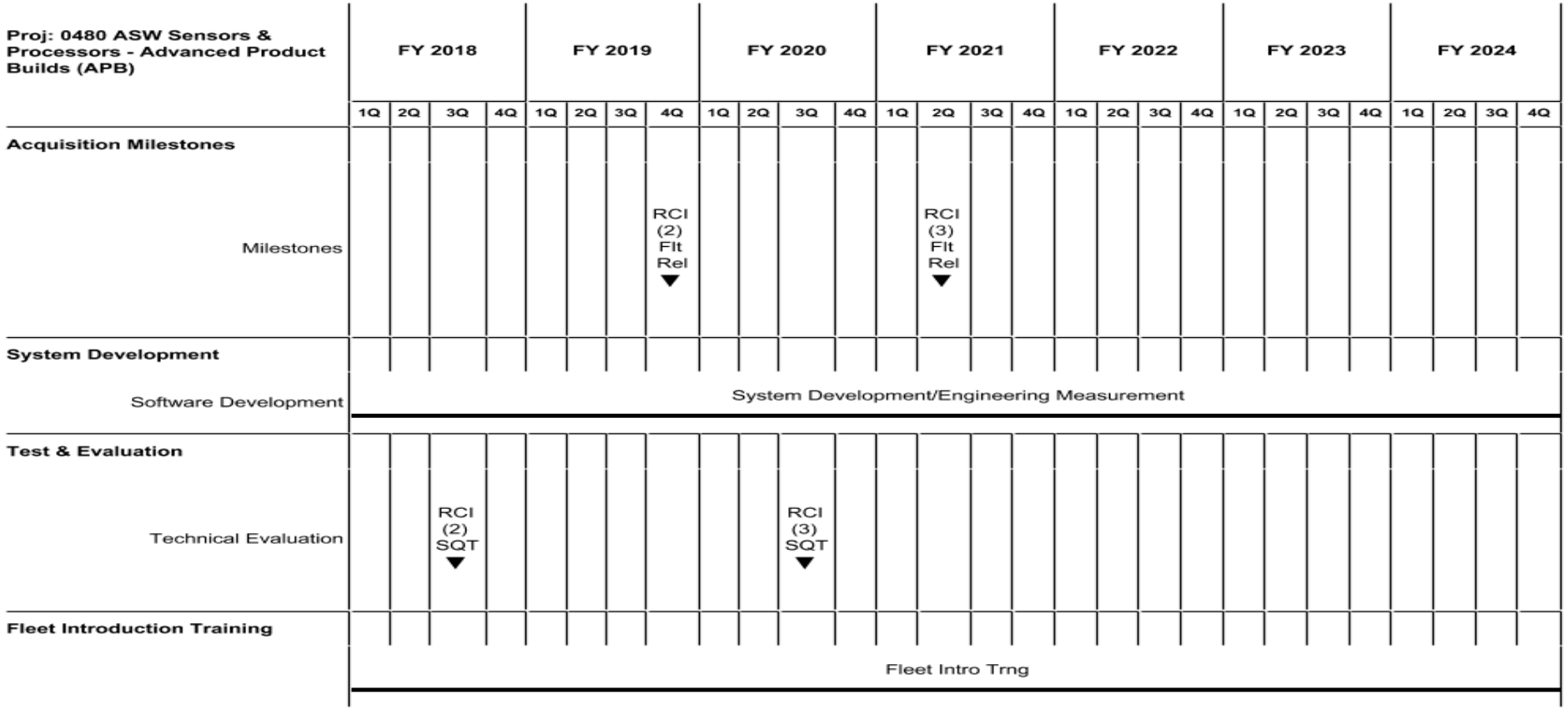
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>0480 / *ASW Sensors & Proc* |




*2020PB - 0604261N - 0480*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>0480 / *ASW Sensors & Proc* |




*2020PB - 0604261N - 0480*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>0480 / *ASW Sensors & Proc* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj: 0480 ASW Sensors & Processors - Multistatic Active Coherent*** | | | | |
| Acquistion Milestones: Reviews and Milestones: Critical Design Review | 1 | 2019 | 1 | 2019 |
| Acquistion Milestones: Reviews and Milestones: Initial Operational Capability | 4 | 2024 | 4 | 2024 |
| System Development: Capability Development and Integration: MAC-E Data Collection & Analysis | 1 | 2018 | 1 | 2021 |
| System Development: Next Gen MAC-E Data Collection & Analysis | 2 | 2021 | 4 | 2024 |
| System Development: MAC-E System of Systems Software Development | 1 | 2018 | 2 | 2021 |
| System Development: Next Gen MAC-E System of Systems Software Development | 3 | 2021 | 4 | 2024 |
| System Development: MAC-E Acoustic Aircraft Software Integration | 1 | 2018 | 3 | 2021 |
| System Development: Next Gen MAC-E Acoustic Aircraft Software Integration | 3 | 2022 | 4 | 2024 |
| Test & Evaluation: Development Test: MAC-E Development Test | 3 | 2018 | 4 | 2022 |
| Test & Evaluation: Operational Test: MAC-E Operational Test | 1 | 2023 | 2 | 2024 |
| Production Milestones: Contract Awards: SSQ-125A PRM | 2 | 2018 | 2 | 2018 |
| Production Milestones: Contract Awards: Sonobuoy Production Contract Award | 1 | 2019 | 1 | 2019 |
| Production Milestones: Contract Awards: Next Gen MAC-E Contract Award | 2 | 2022 | 2 | 2022 |
| ***Proj: 0480 ASW Sensors & Processors - Advanced Product Builds (APB)*** | | | | |
| Acquisition Milestones: Milestones: RCI (2) Fleet Release | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: Milestones: RCI (3) Fleet Release | 2 | 2021 | 2 | 2021 |
| System Development: Software Development: System Development/Engineering Measurement | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Technical Evaluation: RCI (2) SQT | 3 | 2018 | 3 | 2018 |
| Test & Evaluation: Technical Evaluation: RCI (3) SQT | 3 | 2020 | 3 | 2020 |
| Fleet Introduction Training: Fleet Introduction Training | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604261N / *Acoustic Search Sensors* | Project (Number/Name)<br>3224 / *High Altitude ASW* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3224: *High Altitude ASW* | 117.539 | 3.624 | 3.886 | 3.968 | - | 3.968 | 4.046 | 4.126 | 4.208 | 4.292 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The High Altitude Anti-Submarine Warfare (HAASW) program increases P-8A operational flexibility and effectiveness throughout the kill chain at higher than traditional ASW altitudes. FY10-FY16 activities included Sonobuoy Technology Development (TD), P-8A Aircraft integration, Training, Test & Evaluation, and Initial Operational Capability. TD includes hardware modifications to current production sonobuoys and software development for the aircraft. Global Positioning System (GPS) integration will provide precise sonobuoy location regardless of aircraft altitude/location to enhance wide area ASW search, localization, track and targeting. The digital telemetry will improve sonobuoy communication performance in high Radio Frequency Interference environments, increase Air Deployable Active Receiver (SSQ-101) channel availability, and provide NATO compatibility. FY18 activities include the integration of an algorithm that will adjust sonobuoy release/drop points for more accurate sonobuoy placement. FY18-FY24 activities include the integration of encryption protections.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** High Altitude Enablers | 3.624 | 3.886 | 3.968 | 0.000 | 3.968 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue ECP 3 FOT&E. Continue digital telemetry/encryption requirements analysis. Continue digital telemetry integration. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue ECP 3 FOT&E. Continue digital telemetry/encryption requirements analysis. Continue digital telemetry integration. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY20 increase funds digital telemetry/encryption efforts. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.624 | 3.886 | 3.968 | 0.000 | 3.968 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4048: *Sonobuoys - All Types* | 173.616 | 237.347 | 260.644 | 2.910 | 263.554 | 264.028 | 271.538 | 275.378 | 279.228 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>3224 / *High Altitude ASW* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

A 15 March 12 Acquisition Decision Memorandum (ADM) from PEO(A) (Milestone Decision Authority) approved the transition from a planned Acquisition Category (ACAT) Program to a series of Engineering Change Proposal (ECP) modifications to the AN/SSQ-53, AN/SSQ-62 and AN/SSQ-101 sonobuoys. Affordability deferred the digital telemetry requirement in the SSQ-53, SSQ-62 and SSQ-125 sonobuoys to FY18-FY24. All major contracts (ERAPSCO & Boeing) to meet P-8A Inc 2 ECP 2 and ECP 3 requirements have been awarded. Integrate cyber security protections.

**E. Performance Metrics**

Schedule and cost variances are used to track sonobuoy development. Should Cost methodology has also been employed to manage the development and production costs of the HAASW capable sonobuoys.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604261N / *Acoustic Search Sensors* | Project (Number/Name)<br>3224 / *High Altitude ASW* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Development | C/CPFF | VARIOUS : VARIOUS | 1.900 | 0.850 | Nov 2017 | 1.000 | Nov 2018 | 1.031 | Nov 2019 | - | | 1.031 | 2.600 | 7.381 | 7.381 |
| Prior year Prod Dev no longer funded in the FYDP | Various | VARIOUS : VARIOUS | 44.280 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| INC 3 A/C Software Integration | C/CPFF | BOEING : SEATTLE WA | 0.000 | 1.500 | Nov 2017 | 1.368 | Nov 2018 | 1.388 | Nov 2019 | - | | 1.388 | 0.000 | 4.256 | 4.256 |
| | | **Subtotal** | 46.180 | 2.350 | | 2.368 | | 2.419 | | - | | 2.419 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Support cost no longer funded in the FYDP | Various | VARIOUS : VARIOUS | 35.380 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 35.380 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Eval | Various | VARIOUS : VARIOUS | 5.503 | 0.644 | Nov 2017 | 0.750 | Nov 2018 | 0.754 | Nov 2019 | - | | 0.754 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 5.503 | 0.644 | | 0.750 | | 0.754 | | - | | 0.754 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Eng Spt | Various | VARIOUS : VARIOUS | 3.322 | 0.152 | Nov 2017 | 0.200 | Nov 2018 | 0.199 | Nov 2019 | - | | 0.199 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604261N / *Acoustic Search Sensors* | Project (Number/Name)<br>3224 / *High Altitude ASW* | |

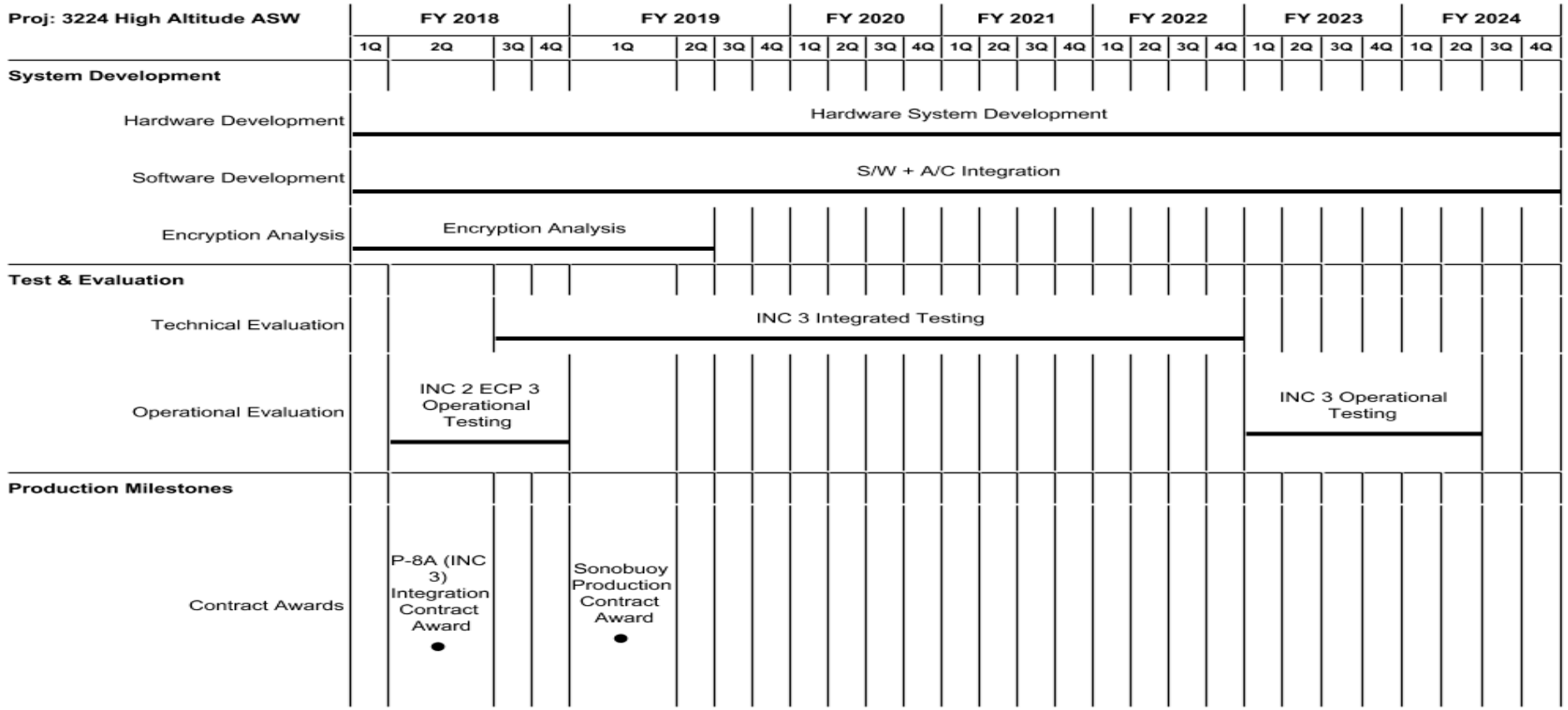
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Eng Spt | WR | NAWCAD : PATUXENT RIVER, MD | 23.565 | 0.478 | Nov 2017 | 0.568 | Nov 2018 | 0.596 | Nov 2019 | - | | 0.596 | Continuing | Continuing | Continuing |
| Prior Year Mngmt Svcs no longer funded in the FYDP | Various | VARIOUS : VARIOUS | 3.589 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 30.476 | 0.630 | | 0.768 | | 0.795 | | - | | 0.795 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 117.539 | 3.624 | | 3.886 | | 3.968 | | - | | 3.968 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>3224 / *High Altitude ASW* |




*2020PB - 0604261N - 3224*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604261N / *Acoustic Search Sensors* | **Project (Number/Name)**<br>3224 / *High Altitude ASW* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj: 3224 High Altitude ASW*** | | | | |
| System Development: Hardware Development: Hardware System Development | 1 | 2018 | 4 | 2024 |
| System Development: Software Development: Aircraft Software Development/ Integration | 1 | 2018 | 4 | 2024 |
| System Development: Encryption Analysis: Encryption Analysis | 1 | 2018 | 2 | 2019 |
| Test & Evaluation: Technical Evaluation: INC 3 Integrated Testing | 3 | 2018 | 4 | 2022 |
| Test & Evaluation: Operational Evaluation: INC 2 ECP 3 Operational Testing | 2 | 2018 | 4 | 2018 |
| Test & Evaluation: Operational Evaluation: INC 3 Operational Testing | 1 | 2023 | 2 | 2024 |
| Production Milestones: Contract Awards: P-8A (INC 3) Integration Contract Award | 2 | 2018 | 2 | 2018 |
| Production Milestones: Contract Awards: Sonobuoy Production Contract Award | 1 | 2019 | 1 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604262N / *V-22A* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 9,351.238 | 176.804 | 135.504 | 185.105 | - | 185.105 | 133.059 | 110.392 | 125.330 | 110.769 | 64.057 | 10,392.258 |
| 1425: *V-22* | 9,351.238 | 162.319 | 135.504 | 185.105 | - | 185.105 | 133.059 | 110.392 | 125.330 | 110.769 | 64.057 | 10,377.773 |
| 9999: *Congressional Adds* | 0.000 | 14.485 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 14.485 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 212 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The V-22 Osprey is an Acquisition Category IC Joint Program led by the Department of the Navy for the purpose of developing, testing, evaluating, procuring and fielding a tilt rotor, vertical takeoff and landing aircraft for Joint Service application. The V-22 program is designed to provide an aircraft to meet the amphibious/vertical assault needs of the Marine Corps, the Carrier Onboard Delivery (COD) needs of the Navy, and the special operations needs of the Air Force and the United States Special Operations Command (USSOCOM). The MV-22 variant is replacing the CH-46E in the Marine Corps and the CMV-22 will replace the C-2A in the Navy. The CV-22 variant replaced the MH-53J and MH-53M and augments the C-130 in the Air Force and USSOCOM. The V-22 is capable of flying over 2,100 nautical miles, with a single refueling, giving the services the advantage of a Vertical/Short Take-off and Landing aircraft that can rapidly self-deploy to any location in the world. This program is funded under Engineering Manufacturing and Development (EMD) for correction of deficiencies and includes Block A and Block B upgrades which encompassed engineering and manufacturing development of new end-items prior to the production incorporation decision as well as Block C suitability and effectiveness development upgrades. Capability Development Document interoperability requirements were addressed through a spiral upgrade acquisition strategy. It was the first spiral providing Key Enabling Department of Defense mandated open systems architecture upgrades for the mission computer hardware and software while simultaneously addressing required interoperability common avionics upgrades and current avionics obsolescence issues. Future development efforts will include Pre-Planned-Product-Improvements in the Capability Development Document and Re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program as prioritized by the United States Marine Corps or an Urgent Universal Needs Statement. Development efforts include Mission System Upgrades, Electrical System Upgrades, Engine Air Particle Separator (EAPS), Mid-Wing Process Unit, ARC 210 Series Radio, Mission Computer Obsolescence Initiative, Weapon Systems Development, Time on Wing, Digital Interoperability (DI), Technology Insertion efforts such as: Infrared Suppressor (IRS), Modular Avionics Mission Computer Re-design / CyberSecurity, Center Console Re-design, Flight Control System Re-design, Degraded Visual Environment (DVE), Helmet Mounted Display and Multi-Spectral Sensor, Aircraft Mission Maneuvering Envelope Expansion and testing of Additive Manufacturing processes for selected MV-22 components.

The V-22 Hardware Development Airframe continues to fund development efforts in support of V-22 Block upgrades, Time on Wing and Safety Improvement efforts such as Cockpit Engine Health Indicator and gearbox vibration monitoring. Continue engineering, logistics, flight test, flight test support and address the correction of deficiencies and obsolescence. Continue V-22 software development/mission computer obsolescence initiatives such as transition tech demo and modular avionics mission computer redesign. Continue V-22 Integrated Aircraft Survivability Equipment to include correcting deficiencies; radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, rotor blade tabs, nacelle sails, Miniature Airborne Global Positioning System Receiver, Defensive

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604262N *I V-22A* |

Weapons capabilities and providing integrated threat warning information on the aircraft's main flight displays. Continue correcting deficiencies of the current EAPS and development of particle separation solutions. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign.

V-22 Hardware Development Propulsion will continue to fund the flight/engine hours that are necessary for the design, development, validation and verification of the V-22 propulsion and power systems at the Patuxent River squadron. Rolls-Royce will continue to provide engine support and development of V-22 flight testing.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

Note:
1st 2 CMV production aircraft are test aircraft. They will be delivered to Patuxent River to support Development Testing (DT).
OT will be conducted as part of a carrier air wing work-up prior to deployment. Operational Testing (OT) will focus on assessing the effectiveness and suitability of the CMV-22 as the Carrier Onboard Delivery platform in the carrier strike group.
There is no Milestone C, because CMV-22 is being executed as an ECP to V-22 Block C. Initial Operational Capability for CMV-22 is FY-21.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 171.386 | 143.079 | 132.805 | - | 132.805 |
| Current President's Budget | 176.804 | 135.504 | 185.105 | - | 185.105 |
| Total Adjustments | 5.418 | -7.575 | 52.300 | - | 52.300 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -7.575 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -6.112 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 51.900 | - | 51.900 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.400 | - | 0.400 |
| • Congressional Directed Reductions Adjustments | -3.470 | - | - | - | - |
| • Congressional Add Adjustments | 15.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *MV-22 CC-RAM Nacelle Improvements* | 14.485 | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| Congressional Add Subtotals for Project: 9999 | 14.485 | 0.000 |
| Congressional Add Totals for all Projects | 14.485 | 0.000 |

**Change Summary Explanation**

FY 2020 increase for CMV hardware development and testing.

Schedule:

1. Hardware Development Schedule - As a result of reprioritization of development efforts Improved Inlet Solution development and flight test were deleted in FY18. Defense Weapon System Re-design, Flight Control System Re-design and Software Data Set Release have been added to the schedule as new requirements.
2. CMV Schedule - FY16 Risk Reduction requirements were reviewed and incorporated in design which delayed Critical Design (CDR) Review and should have been included on the FY19 Presidents Budget. Physical Configuration Audit updated to reflect first aircraft delivery. Initial Operational Capability added 4Q21 and Live Fire Event added 3Q20 as they were missing from the schedule. Production quantities and deliveries have been updated to reflect increased quantities. The FY22 Developmental Testing reflects new capabilities being developed. OT testing will begin in FY25 and out.
3. DI Schedule - Schedule updated to reflect additional detail as provided in the Congressional RFI.
4. VARS Schedule - Flight Test deleted as it is part of DT/OT. DT/OT slid to the right due to design updates.
5. Electrical System Redesign - Schedule updated to reflect additional detail as provided in the Congressional RFI.
6. IRS Schedule - Schedule updated to reflect additional detail as provided in the Congressional RFI.
7. Technology Insertion Schedule - Contract Award and System Requirements Review added as they were missing on the schedule. Beginning in FY20, efforts are included in the Open System Architecture / Cyber Security line.
8. Multi-Spectral Schedule - Contract Award, CDR and Flight Testing have moved one year to the right as requirements were further refined.
9. Swashplate Actuator schedule deleted as program is no longer funded.
10. Beginning in FY20 Open System Architecture/Cyber Security was established in order to correctly capture all of the Open System Architecture/Cyber Security efforts under one project.

Technical: Not applicable

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604262N / *V-22A* | Project (Number/Name)<br>1425 / *V-22* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1425: *V-22* | 9,351.238 | 162.319 | 135.504 | 185.105 | - | 185.105 | 133.059 | 110.392 | 125.330 | 110.769 | 64.057 | 10,377.773 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 212

**A. Mission Description and Budget Item Justification**

The V-22 Osprey is an Acquisition Category IC Joint Program led by the Department of the Navy for the purpose of developing, testing, evaluating, procuring and fielding a tilt rotor, vertical takeoff and landing aircraft for Joint Service application. The V-22 program is designed to provide an aircraft to meet the amphibious/vertical assault needs of the Marine Corps, the Carrier Onboard Delivery (COD) needs of the Navy, and the special operations needs of the Air Force and the United States Special Operations Command (USSOCOM). The V-22 is replacing the CH-46E in the Marine Corps with the MV-22; will supplement the H-60 in the Navy with the MV-22; and replace the MH-53J and MH-53M as well as augment the C-130 in the Air Force and USSOCOM with the CV-22. The V-22 is capable of flying over 2,100 nautical miles, with a single refueling, giving the services the advantage of a Vertical/Short Take-off and Landing aircraft that can rapidly self-deploy to any location in the world. This program is funded under Engineering Manufacturing and Development (EMD) for correction of deficiencies and includes Block A and Block B upgrades which encompassed engineering and manufacturing development of new end-items prior to the production incorporation decision as well as Block C suitability and effectiveness development upgrades. Capability Development Document interoperability requirements were addressed through a spiral upgrade acquisition strategy. It was the first spiral providing Key Enabling Department of Defense mandated open systems architecture upgrades for the mission computer hardware and software while simultaneously addressing required interoperability common avionics upgrades and current avionics obsolescence issues. Future development efforts will include Pre-Planned-Product-Improvements in the Capability Development Document and Re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program as prioritized by the United States Marine Corps or a Urgent Universal Needs Statement. Development efforts include Mission System Upgrade, Electrical System Upgrades, Engine Air Particle Separator (EAPS), Mid-Wing Process Unit, ARC 210 Series Radio, Mission Computer Obsolescence Initiative, Weapon Systems Development, Time on Wing, Digital Interoperability (DI), Technology Insertion such as: Infrared Suppressor (IRS), Modular Avionics Mission Computer Re-design / CyberSecurity, Center Console Re-design, Flight Control System Re-design, Degraded Visual Environment (DVE), Helmet Mounted Display and Multi-Spectral Sensor, Aircraft Mission Maneuvering Envelope Expansion and testing of Additive Manufacturing processes for selected MV-22 components.

The V-22 Hardware Development Airframe continues to fund development efforts in support of V-22 Block upgrades, Time on Wing and Safety Improvement efforts such as Cockpit Engine Health Indicator and gearbox vibration monitoring. Continue engineering, logistics, flight test, flight test support and address the correction of deficiencies and obsolescence. Continue V-22 software development/mission computer obsolescence initiatives such as transition tech demo and modular avionics mission computer redesign. Continue V-22 Integrated Aircraft Survivability Equipment to include correcting deficiencies; radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, rotor blade tabs, nacelle sails, Miniature Airborne Global Positioning System Receiver (MAGR2K), Defensive Weapons capabilities and providing integrated threat warning information on the aircrafts main flight displays. Continue correcting deficiencies of the current EAPS and development of particle separation solutions. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

V-22 Hardware Development Propulsion will continue to fund the flight/engine hours that are necessary for the design, development, validation and verification of the V-22 propulsion and power systems at the Patuxent River squadron. Rolls-Royce will continue to provide engine support and development of V-22 flight testing.

FY20 continues DI, United States Marine Corps Aviation wide implementation of software defined radios, such as Software Reprogrammable Payload, capable of migration to advanced waveforms and payloads, providing enhanced digital connectivity between forces using dissimilar waveforms and/or protocols. DI will enable fleet integration of new capability through the use of tablets with custom applications. DI is also envisioned to include logistics tracking (cargo and personnel) with the use of Radio Frequency Identification technology, advanced Electronic Warfare/Cyber capability, and threat data capturing/off-boarding.

FY20 continues the CMV-22 Hardware Development efforts which consist of an Engineering Change Proposal (ECP) to modify MV-22 into the CMV-22 configuration to perform the COD mission. The ECP will add such things as (1) the capability to meet the range requirements that the COD mission demands, (2) a high frequency (HF) radio to transmit/receive beyond line of sight over water and (3) a public address system for use while transporting passengers. CMV-22 will begin development testing to include preliminary envelope expansion, Electromagnetic Environment Effects testing, HF radio testing and begin Carrier Suitability and integration testing. CMV will continue to support development efforts such as: EAPS, Electrical System (IRS) Re-design, Center Console Re-design and Modular Avionics / Cyber Security Implementation.

FY20 continues Electrical System re-design and reliability improvement efforts. Upgrading the V-22 electrical system reliability and capacity is required to accommodate demands on electrical power system as additional systems are added to the V-22 aircraft. This effort will design, develop, validate and verify engineering solutions to improve (1) the Constant Frequency Generator, (2) the Variable Frequency Generator and (3) all associated electrical system interfaces.

FY20 continues IRS Re-design and Reliability improvement efforts. The IRS system masks the infrared signature of the V-22 aircraft, which increases operational survivability. The current IRS system fails to meet reliability requirements. This effort will design, develop, validate and verify engineering solutions to improve the V-22 IRS system to include funds for the EMD and instrumented flight test of IRS system solutions.

FY20 continues development efforts for Technology Insertion under Open Systems Architecture Maturation of aircraft interfaces to support Cyber-Resilient interoperability. Also includes risk reduction and development efforts such as Modular Avionics/Cyber Security Implementation, Cyber/Safe Flight Controls improvements and Center Console Redesign.

FY20 continues V-22 Multi-Spectral Sensor risk reduction and developmental efforts for an improved Navigation Sensor including added capabilities such as targeting and designating as well as DVE improvements.

FY20 Continues development efforts started under the Technology Insertion line.Open System Architecture / Cyber Security provides new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support Cyber-Resilient interoperability.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** V-22 Hardware Development Airframe | 9.150 | 20.335 | 28.029 | 0.000 | 28.029 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** The V-22 Hardware Development Airframe continues to fund development efforts. Continue development in support of V-22 Block upgrades, electrical system capacity efforts, Time on Wing/Reliability Improvements efforts such as testing of Additive Manufacturing processes for selected V-22 components and Safety Improvement efforts such as Cockpit Engine Health Indicator (CEHI) and gearbox vibration monitoring. Continue engineering, logistics, flight test, flight test support and address the correction of deficiencies and obsolescence. Continue V-22 software development/sustainment efforts such as transition tech demo, Modular Avionics Mission Computer Obsolescence Initiative re-design and Flight Control System. Continue V-22 integrated aircraft survivability equipment to include correcting deficiencies; radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, cockpit interface units, electrical power system, rotor blade tabs, nacelle sails, Miniature Airborne Global Positioning System Receiver (MAGR2K) - which is part of DI, Defensive Weapons capabilities and providing integrated threat warning information on the aircraft main flight displays. Continue correcting deficiencies of the current EAP's and development of particle separation solutions. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign.

***FY 2019 Plans:***
Continued MV-22 development efforts. Continue MV-22 software development/sustainment efforts. Continue development in support of MV-22 Block upgrades, MAGR2K, Time on Wing/Reliability Improvements such as testing of Additive Manufacturing processes for selected MV-22 components and Safety Improvement efforts such as CEHI and gearbox vibration monitoring. Continue engineering, logistics, flight test, flight test support and address correction of deficiencies and obsolescence efforts such as Engine Air Particle Separator, also including training upgrades and developments. Continue reliability improvement efforts as well as Re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program.

***FY 2020 Base Plans:***
Continue V-22 development efforts including but not limited to: rotor blade tabs, nacelle sails and MAGR2K. Continue V-22 software development efforts. Continue development in support of V-22 Block upgrades, Time on Wing/Reliability Improvements such as testing of Additive Manufacturing processes for selected V-22 components and Safety Improvement efforts such as CEHI and gearbox vibration monitoring. Continue engineering, logistics, flight test, flight test support, address correction of deficiencies and obsolescence efforts such as Engine Air Particle Separator, Flight Control System, Air Data Unit, Defensive Weapons capabilities,

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, cockpit interface units and also including training upgrades and developments. Continue reliability improvement efforts as well as Re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program. .<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in FY 2020 for Hardware Development due to design changes to the Flight Control System and Air Data Unit due to obsolescence. | | | | | |
| ***Title:*** V-22 Hardware Development Propulsion/Mission Care | 1.487 | 1.712 | 2.139 | 0.000 | 2.139 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Hardware Development Propulsion / Mission Care funds the flight/engine hours that are necessary for the design, development, validation and verification of the V-22 propulsion and power systems at the Patuxent River squadron. In addition, it pays for Rolls Royce to provide engine support and development of the V-22 flight testing.<br>***FY 2019 Plans:***<br>Funds continued for Mission Care flight & engine hours for developmental testing at Patuxent River squadron.<br>***FY 2020 Base Plans:***<br>Funds continue for flight/engine hours that are necessary for the design, development, validation and verification of the V-22 propulsion and power systems at the Patuxent River squadron. Rolls Royce will continue to provide engine support and development of V-22 flight testing.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in FY 2020 for Hardware Development Propulsion / Mission Care is due to increased engine hardware and software improvement efforts. | | | | | |
| ***Title:*** V-22 Digital Interoperability | 10.361 | 32.514 | 28.254 | 0.000 | 28.254 |
| ***Articles:*** | - | - | - | - | - |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Digital Interoperability (DI) is the United States Marine Corps Aviation wide implementation of gateway and software defined radios, such as Software Reprogrammable Payload, capable of migration to advanced waveforms and payloads, providing enhanced digital connectivity between forces using dissimilar waveforms and/or protocols. DI will enable fleet integration of new capability through the use of tablets with custom applications. DI is also envisioned to include logistics tracking (cargo and personnel) with the use of Radio Frequency Identification technology, advanced Electronic Warfare/Cyber capability, and threat data capturing/off-boarding.<br><br>***FY 2019 Plans:***<br>Funds continued for the maturation of Marine Air Ground Task Force Agile Network Gateway Link. This includes DI and assessment of effectiveness via gateway messaging, data flow, data assurance, and quality of service to support the Information Exchange Requirements to support the approved integrated aviation survivability equipment information systems Initial Capability Document, distributed electronic warfare operations, data fusion, and mission thread Information exchange Requirements across the range of military operations.<br><br>***FY 2020 Base Plans:***<br>Funds continue for the maturation of Marine Air Ground Task Force Agile Network Gateway Link. This includes DI, Mesh Network Manager and assessment of effectiveness via gateway messaging, data flow, data assurance, and quality of service to support the Information Exchange Requirements to support the approved Integrated Aviation Survivability Equipment information systems Initial Capability Document, distributed electronic warfare operations, data fusion, and mission thread Information exchange Requirements across the range of military operations.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease for DI is due to the fact that hardware was procured in FY 2019 and is not required in FY 2020. | | | | | |
| ***Title:*** V-22 Software Reprogrammable Payload (SRP)<br>***Articles:***<br><br>***Description:*** SRP is a single common payload module that is open architecture, government owned, flexible, and reconfigurable to support simultaneous missions and applications making maximum use of available bandwidth and ensuring interoperability. Provides a bridge and translator to allow various systems/waveforms to collaborate and provides the V-22 operator and passenger with a common operating picture. | 12.543<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** V-22 CMV Development | 63.089 | 20.781 | 45.359 | 0.000 | 45.359 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding supports the implementation of an Engineering Change Proposal (ECP) to incorporate the new systems required for the CMV-22 configuration to perform the Carrier Onboard Delivery (COD) mission. The ECP will add (1) the capability to meet the range requirements that the COD mission demands (2) a High Frequency (HF) radio to transmit/receive Beyond Line Of Sight (BLOS) over water and (3) a Public Address system for use while transporting passengers. CMV-22 will begin development testing to include things such as preliminary envelope expansion, Electromagnetic Environment Effects testing , HF radio testing and begin Carrier Suitability and Integration testing. Continue CMV-22 integrated aircraft survivability equipment to include correcting deficiencies of the current EAPS, Electrical System Re-design, Infrared Suppressor (IRS) Re-design, Center Console Re-design and Modular Avionics / Cyber Security Implementation.<br>***FY 2019 Plans:***<br>Continued funding for the V-22 CMV Development effort to perform the COD mission. Support the development of Functional Test Plans for the High Frequency (HF) radio to transmit/receive BLOS over water and the PA system. Development of the Joint Vertical Experimental Application System Software (JASS) will continue. Continue Modular Avionics software development / sustainment efforts such as Mission Computer obsolescence initiative redesign and modular software. Continue developmental efforts such as swashplate actuator, electrical system re-design, EAPS, IRS re-design and Cyber Security implementation. Begin the test instrumentation design and planning for the CMV aircraft. Begin Carrier Suitability and Integration testing and will complete developmental test risk reduction activities on PA system and HF radio and begin Alternate Live Fire Test and Evaluation development activities.<br>***FY 2020 Base Plans:***<br>Continues funding for the V-22 CMV Development effort to perform the COD mission. Support the development of Functional Test Plans for the HF radio to transmit/receive beyond line of sight over water and the PA | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| system. Development of the Joint Vertical Experimental Application System Software will continue. Begin the development testing for the CMV-22 with preliminary envelope expansion testing and Electromagnetic Environment Effects testing. Continue Modular Avionics software development / sustainment efforts such as Mission Computer obsolescence initiative redesign and modular software. Continue developmental efforts such as electrical system re-design, EAPS, IRS re-design and Cyber Security implementation. Continue the test instrumentation design and planning for the CMV-22 aircraft. Continue the Carrier Suitability and Integration testing and will complete developmental test risk reduction activities on the HF radio and complete Alternate Live Fire Test and Evaluation development activities. Begin Operational testing. Begin Interoperability development for additional critical capabilities such as Link-16, Mobile Users Objective System, Required Navigation Performance / Area Navigation, and secondary BLOS.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase for CMV Development for Integration of critical interoperability capabilities, open architecture and readiness improvements. | | | | | |
| ***Title:*** V-22 Electrical System Re-design<br>***Articles:***<br>***Description:*** Continue Electrical System re-design and reliability improvement efforts. Upgrading the V-22 electrical system reliability and capacity is required to accommodate demands on electrical power system as additional systems are added to the V-22 aircraft. This effort will design, develop, validate and verify engineering solutions to improve: (1) the Constant Frequency Generator (CFG), (2) the Variable Frequency Generator (VFG) and (3) all associated electrical system interfaces.<br>***FY 2019 Plans:***<br>Continued Electrical System re-design and reliability improvement efforts noting the revised Acquisition strategy that will redesign and replace only the CFG GCU without relocating the GCU.<br>***FY 2020 Base Plans:***<br>Continues Electrical System re-design and reliability improvement efforts with the design, development, validation and verification of engineering solutions to improve the V-22 CFG/GCU.<br>***FY 2020 OCO Plans:*** | 0.000<br>- | 5.839<br>- | 5.926<br>- | 0.000<br>- | 5.926<br>- |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY2020 funds the validation and verification of engineering solutions for the CFG/GCU. | | | | | |
| ***Title:*** V-22 Aerial Refueling System Development | 19.366 | 13.574 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** V-22 Aerial Refueling System (VARS) will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. The system will allow the V-22 to provide fuel to other Air Combat Element aircraft, such as F-35B, F-18, AV-8B, V-22 and CH-53E/K, while en-route, in the objective area, or during recovery, extending the operational reach/duration. With the V-22 deployed onboard, amphibious assault ships would gain an organic aerial refueling capability, maximizing response time and agility.<br><br>***FY 2019 Plans:***<br>Continued funding for the VARS Development Capability. VARS will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. The FY19 funding will be used to supply engineering support for any issues identified during flight test and initial fleet deployment as well as continued support equipment development and delivery.<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 due to the cancellation of the VARS program. | | | | | |
| ***Title:*** V-22 Infrared Suppressor (IRS) Re-design | 0.150 | 3.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continue Infrared Suppressor (IRS) redesign and reliability improvement efforts. The IRS system masks the infrared signature of the V-22 aircraft, which increases the operational survivability. The current IRS system fails to meet reliability requirements and continues to be a high readiness degrader. V-22 IRS system to include funds for the Engineering & Manufacturing Development (EMD) and instrumented flight test of IRS system solutions. | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Funding continued for the development of a new IRS system for the V-22. The ISR system masks the infrared signature of an aircraft which increases the survivability. FY19 funding will provide for continued Engineering & Manufacturing Development of an upgraded IRS system.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease in IRS Re-design to support higher Marine Corp priorities. | | | | | |
| ***Title:*** V-22 Technology Insertion<br>***Articles:***<br>***Description:*** The V-22 Technology Insertion development effort will provide new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support interoperability. Tech Insertion includes risk reduction and development efforts such as Modular Avionics/Cyber Security Implementation, Enhanced Defensive Weapons Capabilities, Radio Frequency Threat Protection, and Airborne Networking.<br>***FY 2019 Plans:***<br>Decreased in FY19 due to congressional mark. Funding was realigned to VARS and Electrical System Redesign.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 14.776<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** V-22 Development Support, Test and Evaluation<br>***Articles:***<br>***Description:*** Funds Government Engineering, Contractor Engineering, including Follow-On Test Evaluation (FOT&E), Developmental Test & Engineering (DT&E), and Operational Test & Evaluation (OT&E) for the V-22 flight events. Perform Government oversight. Execute test program risk reduction efforts, as well as fund Tactical | 29.897<br>- | 34.378<br>- | 48.499<br>- | 0.000<br>- | 48.499<br>- |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Training Theatre Assessment and Planning Phase III program to ensure that all Navy training and testing at sea is compliant with the major Federal environmental laws.<br><br>***FY 2019 Plans:***<br>Funds provided for continued support of FOT&E, DT&E and OT&E to include flight control software, vehicle system<br>operating software, inlet distortion, APR-39D(V)2, structural fatigue, envelope expansion, software airframe loads,<br>integrated aircraft survivability equipment, Traffic Collision Avoidance System, Bonded Tabs, Aerial Refueling System and Refueling Envelope, Tactical Training Theatre Assessment and Planning Phase III and CMV risk reduction.<br><br>***FY 2020 Base Plans:***<br>Funds provided for continued support of FOT&E, DT&E and OT&E to include flight control software, vehicle system<br>operating software, inlet distortion, APR-39D(V)2, structural fatigue, envelope expansion, software airframe loads,<br>Integrated Aircraft Survivability Equipment, Traffic Collision Avoidance System, Bonded Blade Tabs, V-22 Aerial Refueling System and Refueling Envelope Expansion, Tactical Training Theatre Assessment and Planning Phase III (Environmental Testing), Sea Trials, Cockpit Engine Health Indicator and CMV Developmental Test and Live Fire.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding for CMV-22 Initial Operational Test and Evaluation (IOT&E) and Engineering Design Studies. | | | | | |
| ***Title:*** V-22 Multi-Spectral Sensor / Helmet Mounted Display | 1.500 | 3.371 | 15.706 | 0.000 | 15.706 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The V-22 Multi-Spectral Sensor / Helmet Mounted Display will provide risk reduction and developmental efforts for an improved Navigation Sensor and a Helmet Mounted Display.<br><br>***FY 2019 Plans:*** | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY19 continued the V-22 Multi-Spectral Sensor/Helmet Mounted Display risk reduction and developmental efforts started in the Technology Insertion line for an improved Navigation Sensor (including added capabilities such as targeting designating and Degraded Visual Environment improvements) and a Helmet Mounted Display.<br>***FY 2020 Base Plans:***<br>FY20 continues the V-22 Multi-Spectral Sensor risk reduction and developmental efforts for an improved Navigation Sensor including added capabilities such as targeting and designating. Will continue Degraded Visual Environment development efforts to improve safety when landing in obscured tactical zones.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in Multi-Spectral Sensor for the elevation of multiple sensors prior to down select of vendors. | | | | | |
| ***Title:*** V-22 Open Systems Architecture / Cyber Security<br>***Articles:***<br>***Description:*** Open System Architecture / Cyber Security provides new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support Cyber-Resilient interoperability. Also includes risk reduction and development efforts such as Modular Avionics / Cyber Security Implementation, Cyber / Safe Flight Control improvements and Center Console Redesign.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Continues development efforts started under the Technology Insertion line. This effort provides new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support Cyber-Resilient Interoperability. Also includes risk reduction and development efforts such as Modular Avionics / Cyber Security Implementation, Cyber / Safe Flight Control Improvements and Center Console Redesign.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | 0.000<br>- | 0.000<br>- | 11.193<br>- | 0.000<br>- | 11.193<br>- |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY 2020 realigned Technology Insertion line funding into the new Open Systems Architecture / Cyber Security line. New schedule has been added. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 162.319 | 135.504 | 185.105 | 0.000 | 185.105 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN 0164: *V-22* | 1,260.538 | 1,157.726 | 995.421 | - | 995.421 | 963.546 | 1,110.269 | 928.746 | 479.423 | 345.413 | 35,987.643 |
| • APN 0590: *V-22 Series* | 222.524 | 197.993 | 325.367 | - | 325.367 | 332.901 | 477.442 | 494.946 | 489.749 | 4,027.853 | 7,981.654 |
| • APN 0605/J0164: *V-22 Inital Spares* | 4.723 | 3.744 | 2.523 | - | 2.523 | 5.096 | 3.234 | 1.475 | 2.031 | 377.899 | 400.725 |
| • RDTE 1160403BB: *CV-22 Special Operations, Aviation Systems* | 14.259 | 22.533 | 28.461 | - | 28.461 | 8.500 | 8.000 | 18.000 | 0.000 | 0.000 | 118.336 |
| • RDTE BA07 0401318F: *CV-22 USAF BA07* | 22.519 | 18.502 | 17.606 | - | 17.606 | 14.873 | 15.183 | 15.459 | 0.000 | 41.970 | 239.333 |

**Remarks**

**D. Acquisition Strategy**

The V-22 is a post Milestone III ACAT-IC program. As a result of mishaps during and subsequent to V-22 Operational Evaluation (Apr and Dec 00), the program was restructured employing a phased approach to return to flight and tactical introduction. The Contractor and Government defined deficient areas within the program/ aircraft requiring correction prior to return to flight. A Block Upgrade approach was planned, with required efforts identified in Block "A", "B", and "C". Block "A" included those efforts necessary to return the V-22 to safe and operational fleet operations. Block "B" included those efforts necessary to improve the effectiveness and suitability of the aircraft. Block "C" includes mission enhancements like weather radar, cabin effectiveness suitability improvements, i.e., Environmental Control System, and Forward Firing ALE-47. Non-recurring development activities are to be initiated and completed for all efforts identified in Block "A", "B", and "C". The Contractor will develop specific Statements of Work and Preliminary Specification Change Notices required to integrate the Block Upgrade efforts into the baseline Program. A Systems Requirements Review, Initial Design Review, and Final Design Review was held for each of the Block efforts so the design maturity could be reviewed and the Government could redirect activities as appropriate. The CV-22 Engineering Manufacturing and Development program is also structured in Blocks to define an evolutionary approach to achieving full operational capability. Block "0" is the initial baseline CV-22 variant. Block "10" enhances mission capability with the addition of terrain following radar, additional fuel tanks, additional radios, and Block "20" includes capabilities such as radio frequency and infrared countermeasures improvements. Additional Blocks are in the planning stages to continue the growth process throughout the operational life of the weapon system. The CMV-22 will add (1) the capability to meet the range requirements that the Carrier Onboard Delivery (COD) mission demands (2) a high frequency radio to transmit/receive beyond line of sight over water and (3) a public address system for use while transporting passengers in support of the COD mission.

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**E. Performance Metrics**

Milestone Reviews.

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**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V-22 Hardware Dev Airframe | Various | Various : Various | 104.611 | 9.150 | Jan 2018 | 20.335 | Jan 2019 | 28.029 | Jan 2020 | - | | 28.029 | 122.519 | 284.644 | - |
| V-22 Hardware Dev Propulsion | SS/CPIF | Rolls-Royce Corp. : Indianapolis, IN | 196.638 | 1.487 | Nov 2017 | 1.712 | Nov 2018 | 2.139 | Nov 2019 | - | | 2.139 | 2.125 | 204.101 | 204.101 |
| V-22 Digital Interoperability | Various | Various : Various | 19.365 | 10.361 | Jan 2018 | 32.514 | Mar 2019 | 28.254 | Mar 2020 | - | | 28.254 | 25.210 | 115.704 | - |
| V-22 Software Reprogrammable Payload (SRP) | Various | NRL : Washington, DC | 13.632 | 12.543 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 26.175 | - |
| V-22 CMV Development | Various | Various : Various | 70.778 | 63.169 | Nov 2017 | 20.782 | Nov 2018 | 45.359 | Nov 2019 | - | | 45.359 | 27.994 | 228.082 | - |
| V-22 Aerial Refueling System Development | SS/CPIF | Bell Boeing : Ridley Park, PA | 27.813 | 19.366 | Jan 2018 | 13.574 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 60.753 | 60.753 |
| V-22 Electrical System Re-Design | SS/FFP | Hamilton Sundstrand Corp : Rockford, IL | 0.852 | 0.000 | | 5.839 | Mar 2019 | 5.926 | Mar 2020 | - | | 5.926 | 71.105 | 83.722 | 83.722 |
| V-22 IRS Re-design | SS/CPFF | Various : Various | 3.809 | 0.150 | Jan 2018 | 3.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 6.959 | 6.959 |
| V-22 Tech Insertion | C/CPFF | Various : Various | 7.306 | 14.696 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 22.002 | 22.002 |
| V-22 Multi-Spectral Sensor / Helmet Mounted Display | C/CPIF | Bell Boeing : Ridley Park, PA | 0.247 | 1.500 | Mar 2018 | 3.371 | Mar 2019 | 15.706 | Mar 2020 | - | | 15.706 | 41.979 | 62.803 | 62.803 |
| V-22 Open Systems Architecture / Cyber Security | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 11.193 | Mar 2020 | - | | 11.193 | 84.290 | 95.483 | - |
| Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 5,106.472 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5,106.472 | - |
| | | **Subtotal** | 5,551.523 | 132.422 | | 101.127 | | 136.606 | | - | | 136.606 | 375.222 | 6,296.900 | N/A |

**Remarks**

Increase in Hardware Development supports Flight Control System Redesigns due to obsolescence and Miniature Airborne Global Positioning System (GPS) Receiver (MAGR 2K) development. Increase for Hardware Development Propulsion / Mission Care is due to increased Developmental Testing for Engine particle separation, hardware and software improvements. Swashplate Actuator deleted as a development program as it is no longer funded. CMV Development increase in funding supports integration of critical interoperability capabilities and open architecture and readiness improvements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604262N / *V-22A* | Project (Number/Name)<br>1425 / *V-22* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V-22 Govt Engineering Sppt | WR | Various : Pax River, MD | 1,114.055 | 2.887 | Nov 2017 | 2.167 | Nov 2018 | 3.066 | Nov 2019 | - | | 3.066 | 23.500 | 1,145.675 | - |
| V-22 CMV Govt Engineering Sppt | WR | Various : Pax River, MD | 4.404 | 6.818 | Nov 2017 | 7.989 | Nov 2018 | 9.797 | Nov 2019 | - | | 9.797 | 13.527 | 42.535 | - |
| Prior Year Support no longer funded in the FYDP | Various | Various : Various | 189.718 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 189.718 | - |
| | | **Subtotal** | 1,308.177 | 9.705 | | 10.156 | | 12.863 | | - | | 12.863 | 37.027 | 1,377.928 | N/A |

**Remarks**

Increase in V-22 Government Engineering supports the design changes for the Flight Control System.
Increase in CMV Government Engineering supports Engineering Design Studies and Requirements development for Link-16/Iridium and Required Navigation Performance / Area Navigation.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V-22 Dev Test & Evaluation | WR | NAWCAD : Pax River, MD | 1,057.060 | 11.445 | Nov 2017 | 13.033 | Nov 2018 | 16.563 | Nov 2019 | - | | 16.563 | 54.983 | 1,153.084 | - |
| V-22 Operational Test & Evaluation | WR | OT&E Force : Norfolk, VA | 59.247 | 3.218 | Dec 2017 | 2.521 | Dec 2018 | 2.771 | Dec 2019 | - | | 2.771 | 23.006 | 90.763 | - |
| V-22 CMV Dev Test & Evaluation | WR | NAWCAD : Pax River, MD | 0.000 | 3.061 | Nov 2017 | 6.230 | Nov 2018 | 12.800 | Nov 2019 | - | | 12.800 | 23.280 | 45.371 | - |
| V-22 CMV Operational Test & Evaluation | WR | OT&E Force : Norfolk, VA | 0.000 | 0.000 | | 0.000 | | 1.000 | Dec 2019 | - | | 1.000 | 2.000 | 3.000 | - |
| Prior Year T & E no longer funded in the FYDP | Various | Various : Various | 48.200 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 48.200 | - |
| | | **Subtotal** | 1,164.507 | 17.724 | | 21.784 | | 33.134 | | - | | 33.134 | 103.269 | 1,340.418 | N/A |

**Remarks**

CMV DT&E begins Live Fire Test & Evaluation (LFT&E) and Initial Operational Test & Evaluation (OT&E) . Increase in V-22 Operational Test and Evaluation reflects the hourly rate increase provided by COMOPTEVFOR. V-22 DT testing begins Cyber Obsolescence testing.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604262N / *V-22A* | Project (Number/Name)<br>1425 / *V-22* | |

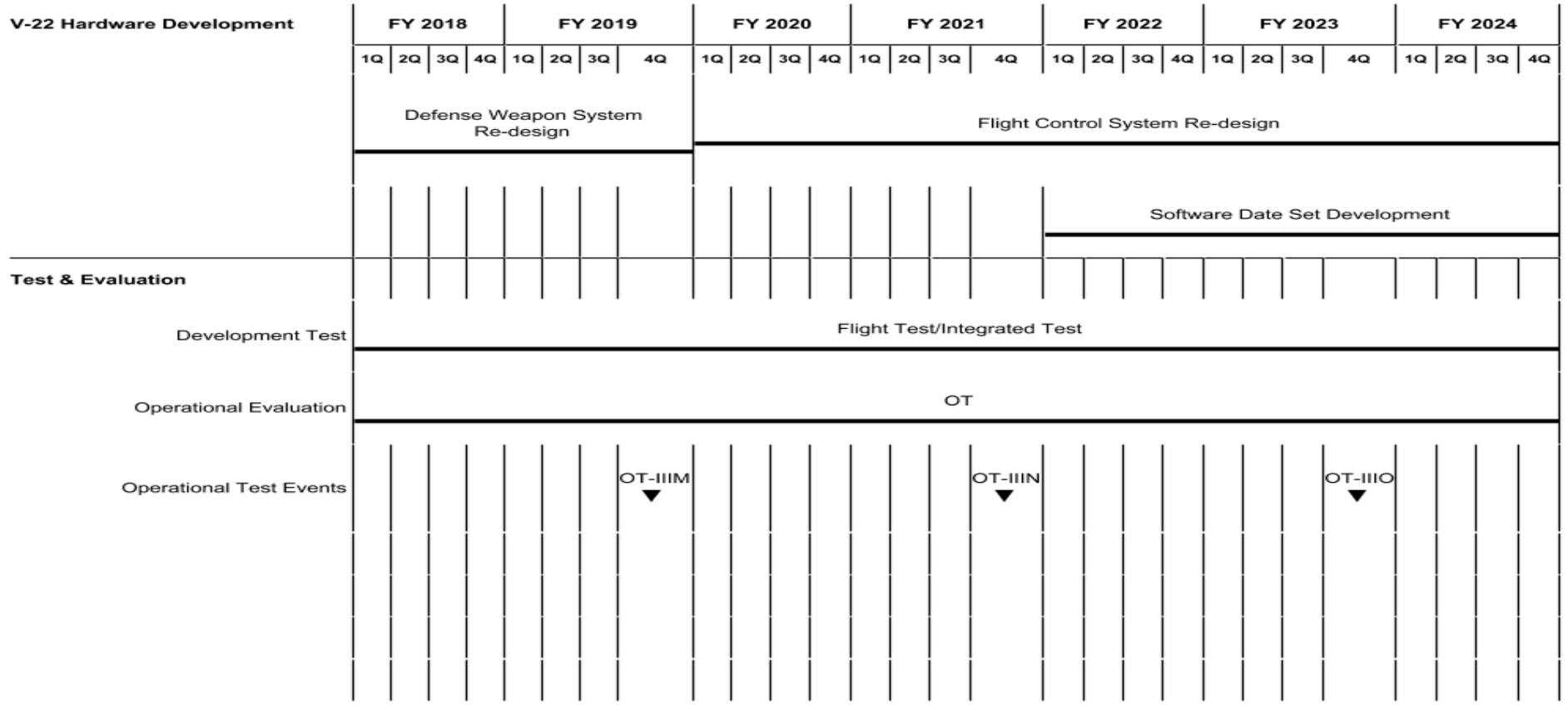
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V-22 Engineering Tech Sppt | Various | Various : Various | 1,047.880 | 0.259 | Nov 2017 | 0.264 | Dec 2018 | 0.272 | Dec 2019 | - | | 0.272 | 6.650 | 1,055.325 | - |
| V-22 Management Sppt Svc | Various | Various : Various | 158.233 | 0.681 | Nov 2017 | 0.695 | Jan 2019 | 0.716 | Jan 2020 | - | | 0.716 | 7.718 | 168.043 | - |
| V-22 Program Mgmt Support | WR | NAWCAD : Pax River, MD | 62.511 | 0.894 | Nov 2017 | 0.816 | Nov 2018 | 0.839 | Nov 2019 | - | | 0.839 | 9.641 | 74.701 | - |
| V-22 Travel | WR | Various : Various | 16.879 | 0.185 | Sep 2018 | 0.185 | Sep 2019 | 0.185 | Sep 2020 | - | | 0.185 | 2.500 | 19.934 | - |
| V-22 CMV Travel | WR | Various : Various | 0.056 | 0.040 | Sep 2018 | 0.060 | Sep 2019 | 0.060 | Sep 2020 | - | | 0.060 | 0.140 | 0.356 | - |
| V-22 CMV Engineering Tech Sppt | Various | Various : Various | 0.385 | 0.409 | Jan 2018 | 0.417 | Jan 2019 | 0.430 | Jan 2020 | - | | 0.430 | 1.440 | 3.081 | - |
| Prior Year Mgmt Svcs no longer funded in the FYDP | Various | Various : Various | 41.087 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.087 | - |
| | | **Subtotal** | 1,327.031 | 2.468 | | 2.437 | | 2.502 | | - | | 2.502 | 28.089 | 1,362.527 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 9,351.238 | 162.319 | | 135.504 | | 185.105 | | - | | 185.105 | 543.607 | 10,377.773 | N/A |

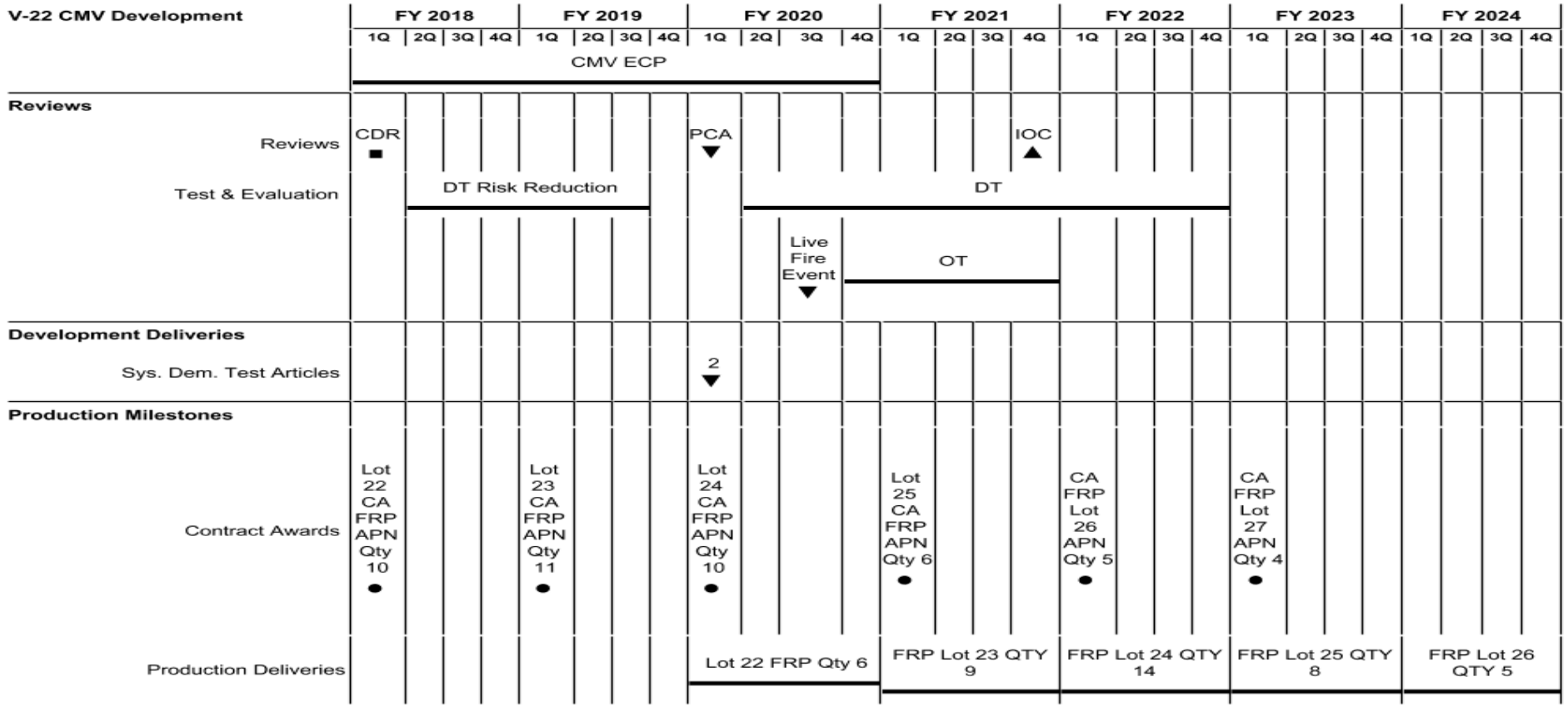
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



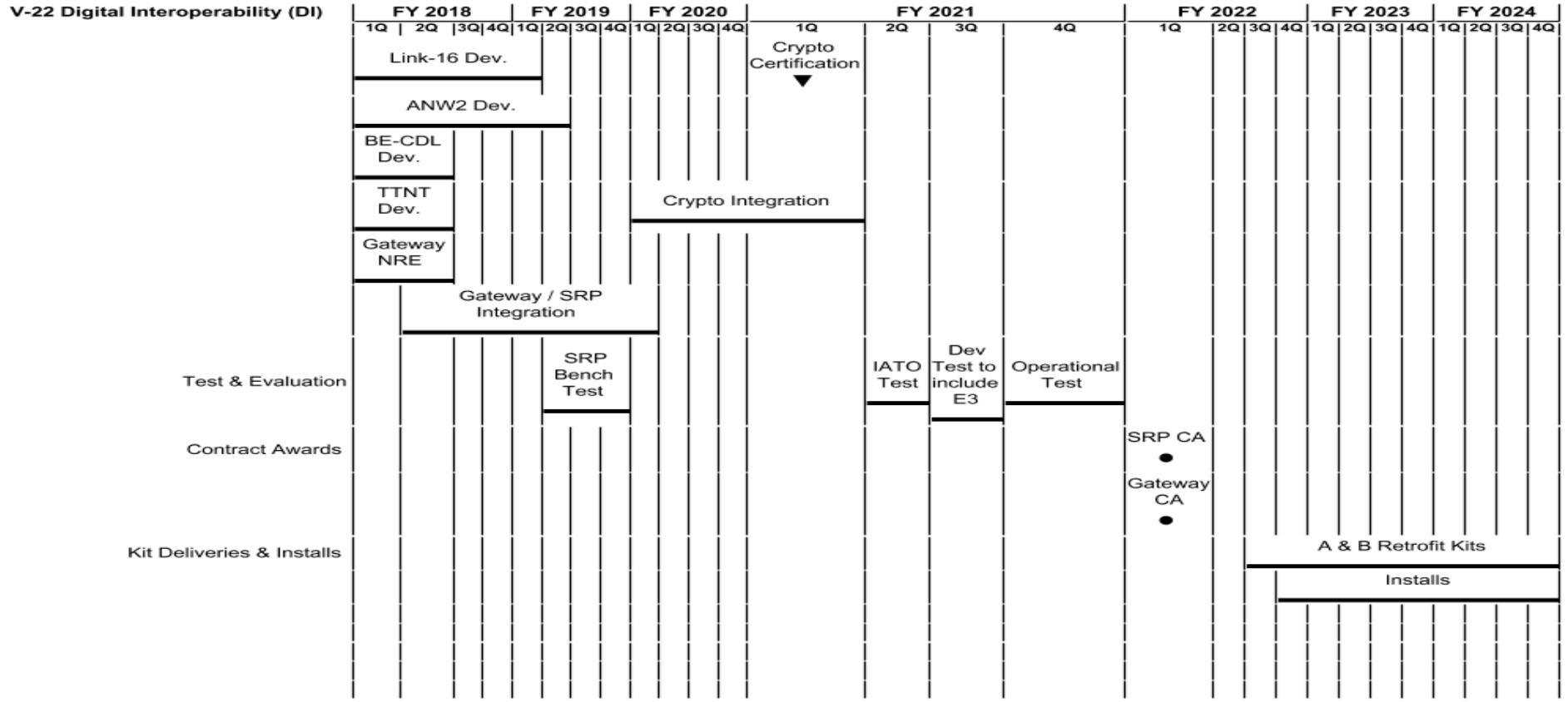

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



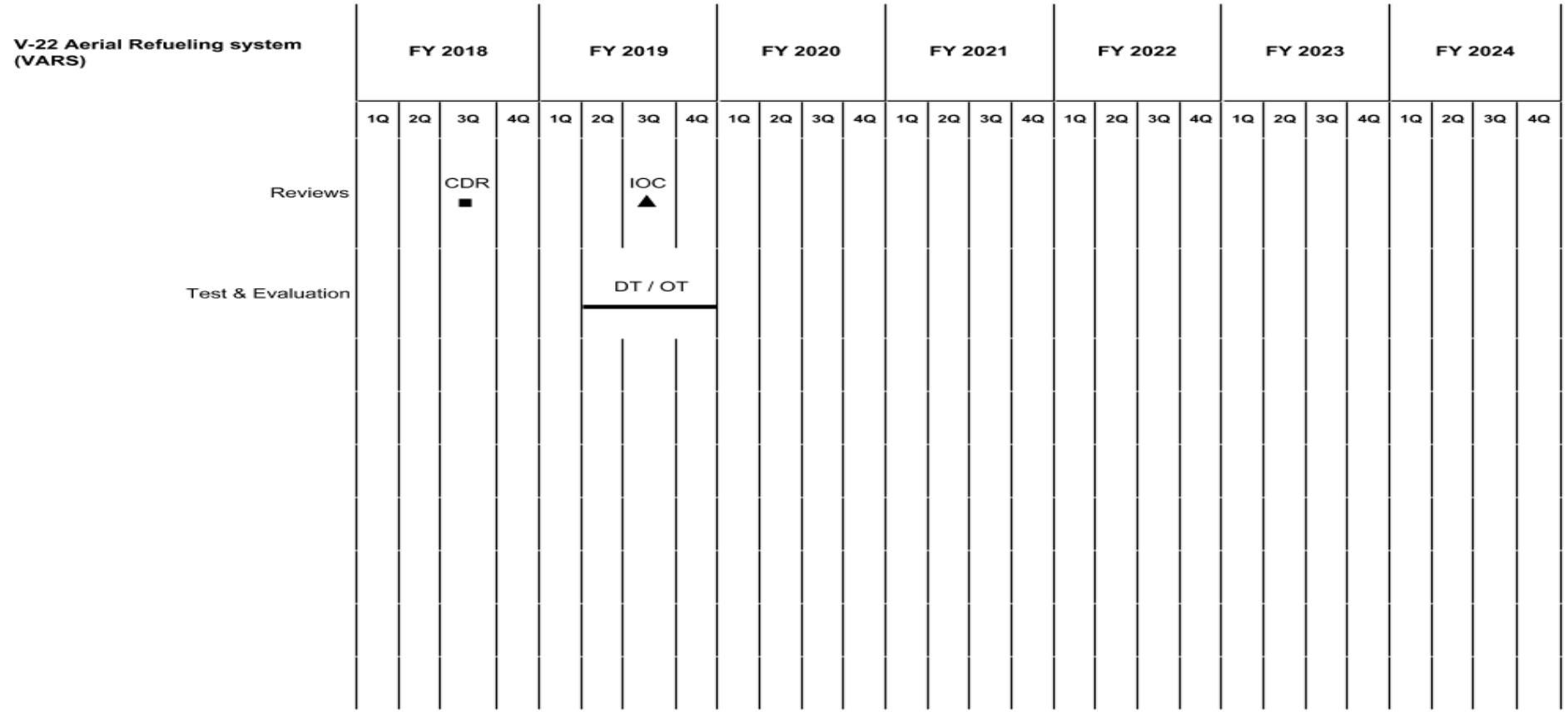

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



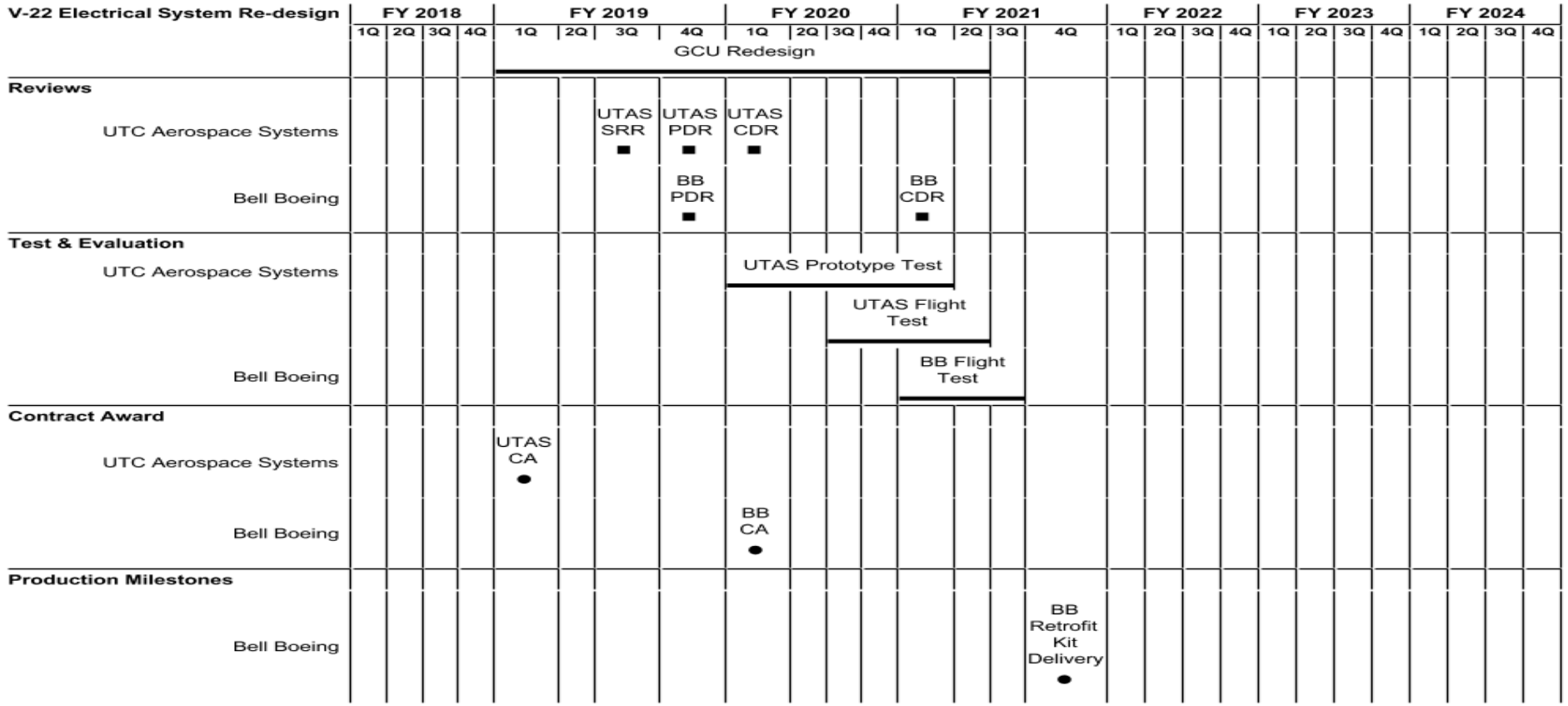

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



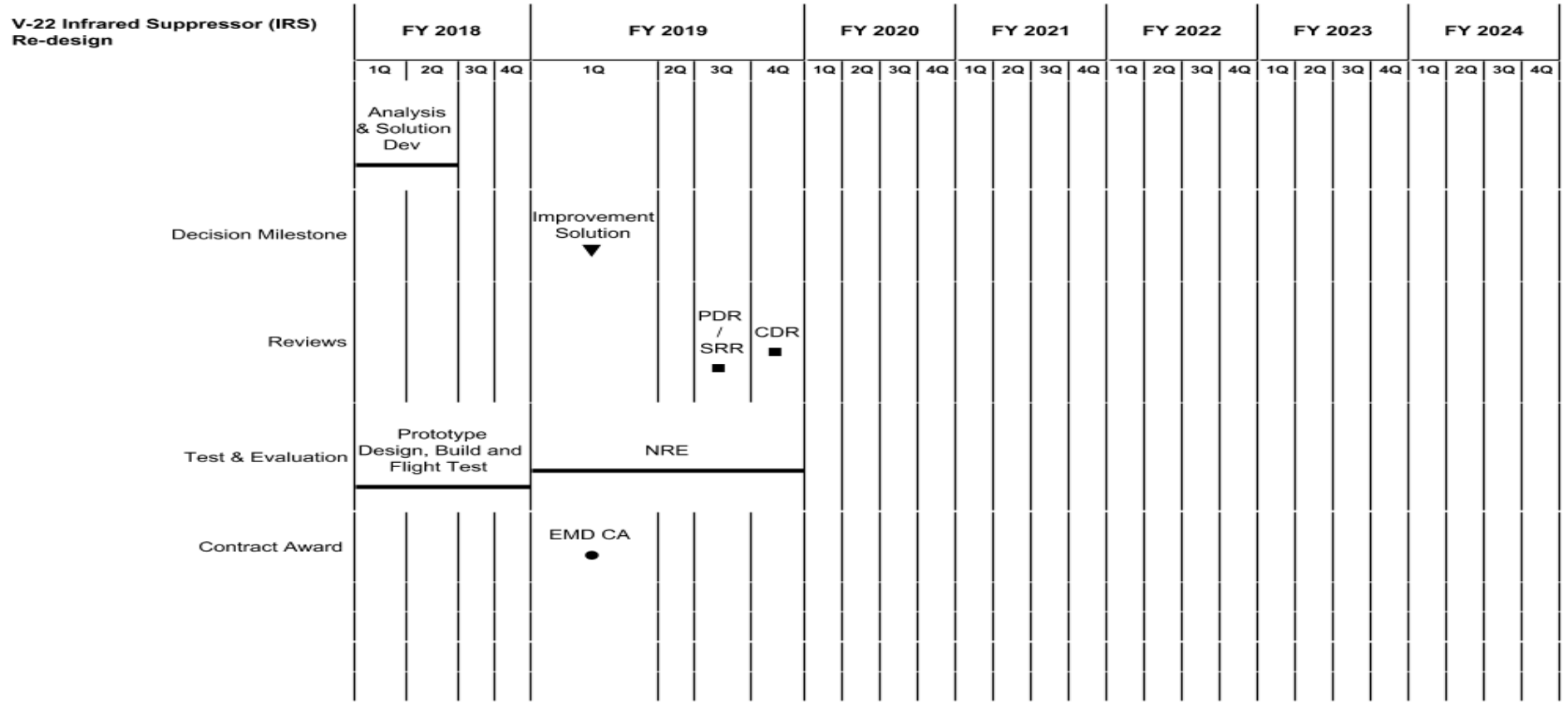

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



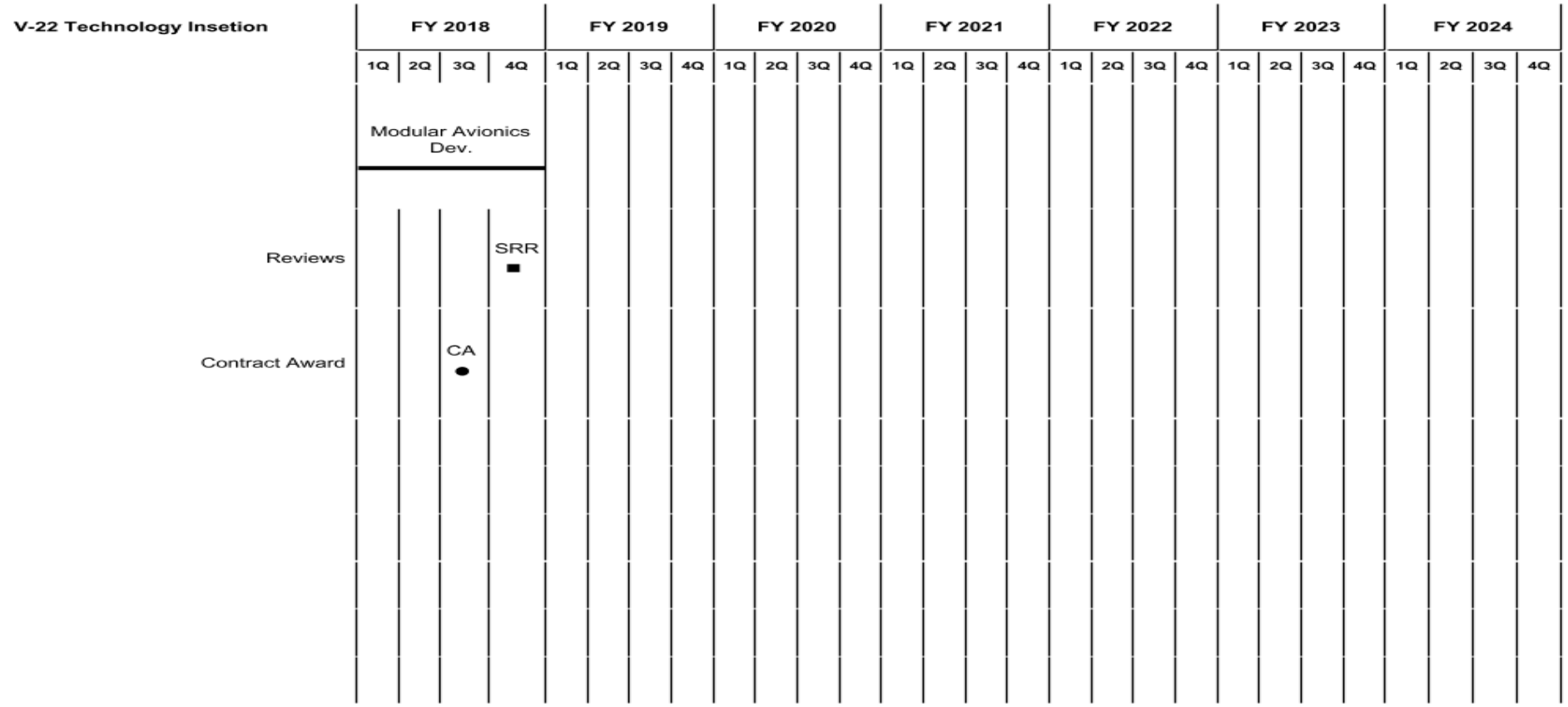

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



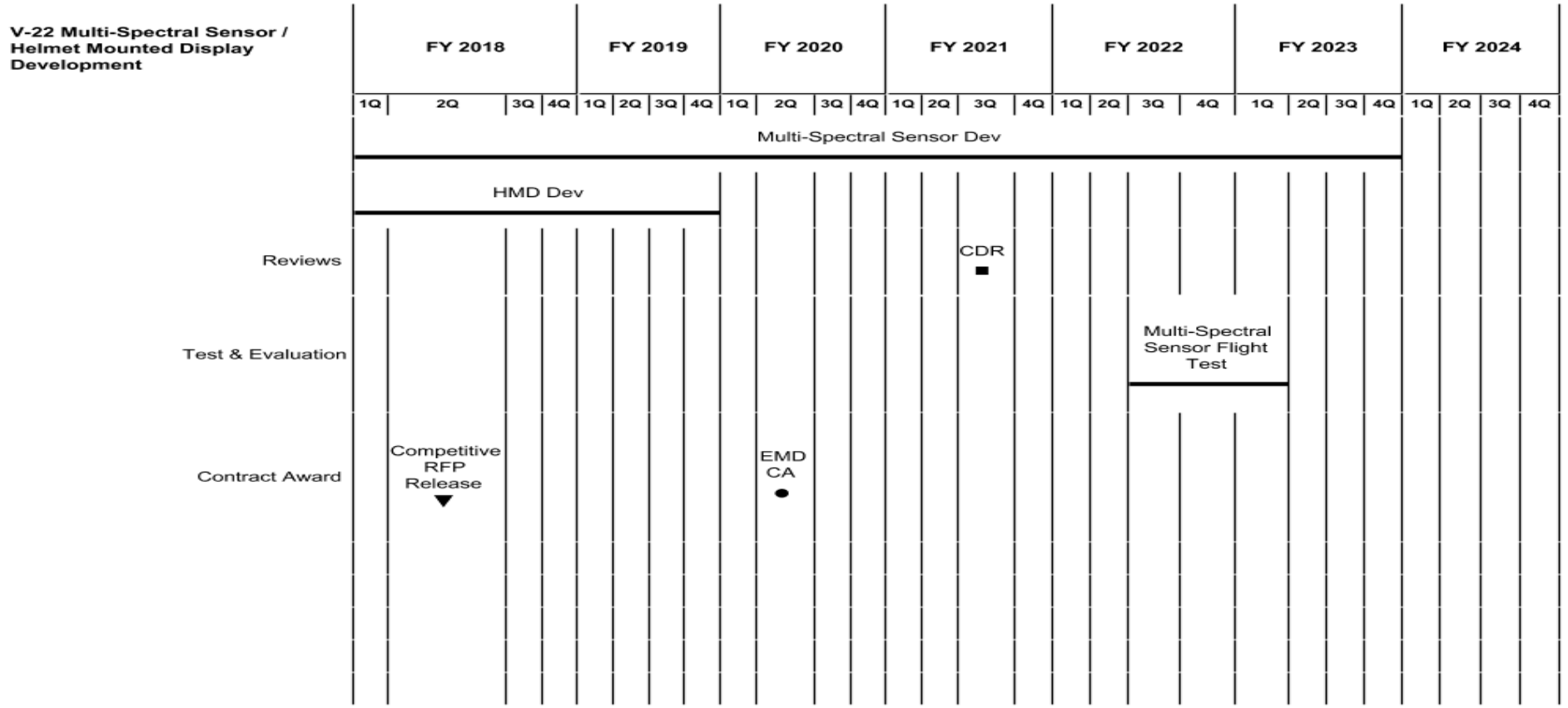

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |



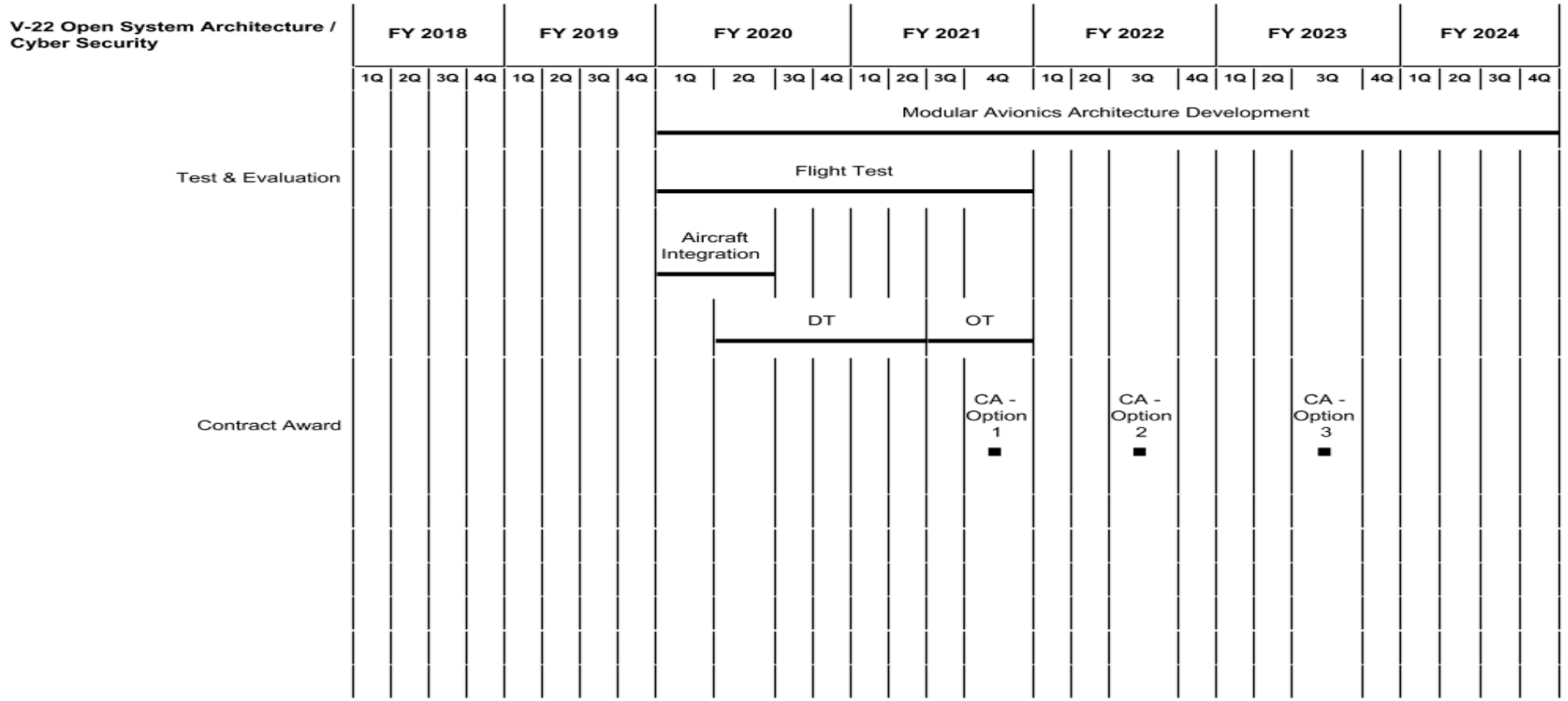

*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |




*2020PB - 0604262N - 1425*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |




*2020PB - 0604262N - 1425*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***V-22 Hardware Development*** | | | | |
| Defense Weapon System Re-design | 1 | 2018 | 4 | 2019 |
| Flight Control System Re-design | 1 | 2020 | 4 | 2024 |
| Software Data Set Release Development | 1 | 2022 | 4 | 2024 |
| Test & Evaluation: Development Test: Development Flight Test / Integrated Test (IT-IIID) & Continuous software sustainment developmental testing | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Operational Evaluation: Operational Testing | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Operational Test Events: Operational Testing (OT-IIIM) | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: Operational Test Events: Operational Testing (OT-IIIN) | 4 | 2021 | 4 | 2021 |
| Test & Evaluation: Operational Test Events: Operational Testing (OT-IIIO) | 4 | 2023 | 4 | 2023 |
| ***V-22 CMV Development*** | | | | |
| Engineering Change Proposal | 1 | 2018 | 4 | 2020 |
| Reviews: Reviews: Critical Design Review | 1 | 2018 | 1 | 2018 |
| Reviews: Reviews: Initial Operational Capability | 4 | 2021 | 4 | 2021 |
| Reviews: Reviews: Physical Configuration Audit | 1 | 2020 | 1 | 2020 |
| Reviews: Test & Evaluation: Developmental Test Risk Reduction | 2 | 2018 | 3 | 2019 |
| Reviews: Test & Evaluation: Developmental Test (DT) | 2 | 2020 | 4 | 2022 |
| Reviews: Test & Evaluation: Live Fire Event | 3 | 2020 | 3 | 2020 |
| Reviews: Test & Evaluation: Operational Test (OT) | 4 | 2020 | 4 | 2021 |
| Development Deliveries: Sys. Dem. Test Articles: Sys. Dem. Test Articles | 1 | 2020 | 1 | 2020 |
| Production Milestones: Contract Awards: Lot 22 APN MV22 CMV Qty 10 | 1 | 2018 | 1 | 2018 |
| Production Milestones: Contract Awards: Lot 23 APN MV22 CMV Qty 11 | 1 | 2019 | 1 | 2019 |
| Production Milestones: Contract Awards: Lot 24 APN MV22 CMV Qty 10 | 1 | 2020 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: Contract Awards: Lot 25 APN MV22 CMV Qty 6 | 1 | 2021 | 1 | 2021 |
| Production Milestones: Contract Awards: Lot 26 APN MV22 CMV Qty 5 | 1 | 2022 | 1 | 2022 |
| Production Milestones: Contract Awards: Lot 27 APN MV22 CMV Qty 4 | 1 | 2023 | 1 | 2023 |
| Production Milestones: Production Deliveries: Lot 22 APN Qty 6 | 1 | 2020 | 4 | 2020 |
| Production Milestones: Production Deliveries: Lot 23 APN CMV Qty 9 | 1 | 2021 | 4 | 2021 |
| Production Milestones: Production Deliveries: Lot 24 APN CMV Qty 14 | 1 | 2022 | 4 | 2022 |
| Production Milestones: Production Deliveries: Lot 25 APN CMV Qty 8 | 1 | 2023 | 4 | 2023 |
| Production Milestones: Production Deliveries: Lot 26 APN CMV Qty 5 | 1 | 2024 | 4 | 2024 |
| ***V-22 Digital Interoperability (DI)*** | | | | |
| Crypto Certification | 1 | 2021 | 1 | 2021 |
| Link-16 Development | 1 | 2018 | 1 | 2019 |
| Adaptive Networking Wideband Waveform Development | 1 | 2018 | 2 | 2019 |
| Bandwidth Efficient Common Data Link Development | 1 | 2018 | 2 | 2018 |
| Tactical Targeting Network Technology Development | 1 | 2018 | 2 | 2018 |
| Crypto Integration | 1 | 2020 | 1 | 2021 |
| Gateway Non-Recurring Engineering (NRE) | 1 | 2018 | 2 | 2018 |
| Gateway / Software Reprogrammable Payload (SRP) Integration | 2 | 2018 | 1 | 2020 |
| Test & Evaluation: SRP Bench Test | 2 | 2019 | 4 | 2019 |
| Test & Evaluation: Interim Authority To Operate Test | 2 | 2021 | 2 | 2021 |
| Test & Evaluation: Developmental Test to Include E3 | 3 | 2021 | 3 | 2021 |
| Test & Evaluation: Operational Test | 4 | 2021 | 4 | 2021 |
| Contract Awards: Software Reprogrammable Payload Contract Award | 1 | 2022 | 1 | 2022 |
| Contract Awards: Gateway Contract Award | 1 | 2022 | 1 | 2022 |
| Kit Deliveries & Installs: Kit Deliveries | 3 | 2022 | 4 | 2024 |
| Kit Deliveries & Installs: Installs | 4 | 2022 | 4 | 2024 |
| ***V-22 Aerial Refueling system (VARS)*** | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Reviews: Critical Design Review | 3 | 2018 | 3 | 2018 |
| Reviews: Initial Operational Capability | 3 | 2019 | 3 | 2019 |
| Test & Evaluation: Developmental Testing / Operational Testing | 2 | 2019 | 4 | 2019 |
| ***V-22 Electrical System Re-design*** | | | | |
| Generator Control Unit Re-design | 1 | 2019 | 2 | 2021 |
| Reviews: UTC Aerospace Systems: UTAS System Requirements Review | 3 | 2019 | 3 | 2019 |
| Reviews: UTC Aerospace Systems: UTAS Preliminary Design Review | 4 | 2019 | 4 | 2019 |
| Reviews: UTC Aerospace Systems: UTAS Critical Design Review | 1 | 2020 | 1 | 2020 |
| Reviews: Bell Boeing: Bell Boeing Preliminary Design Review | 4 | 2019 | 4 | 2019 |
| Reviews: Bell Boeing: Bell Boeing Critical Design Review | 1 | 2021 | 1 | 2021 |
| Test & Evaluation: UTC Aerospace Systems: UTAS Prototype Testing | 1 | 2020 | 1 | 2021 |
| Test & Evaluation: UTC Aerospace Systems: UTAS Flight Test | 3 | 2020 | 2 | 2021 |
| Test & Evaluation: Bell Boeing: Bell Boeing Flight Test | 1 | 2021 | 3 | 2021 |
| Contract Award: UTC Aerospace Systems: UTAS Contract Award | 1 | 2019 | 1 | 2019 |
| Contract Award: Bell Boeing: Bell Boeing Contract Award | 1 | 2020 | 1 | 2020 |
| Production Milestones: Bell Boeing: Bell Boeing Retrofit Kit Delivery | 4 | 2021 | 4 | 2021 |
| ***V-22 Infrared Suppressor (IRS) Re-design*** | | | | |
| Analysis and Solution Development | 1 | 2018 | 2 | 2018 |
| Decision Milestone: Improvement Solution Down Select | 1 | 2019 | 1 | 2019 |
| Reviews: Preliminary Design Review / Systems Requirements Review | 3 | 2019 | 3 | 2019 |
| Reviews: Critical Design Review | 4 | 2019 | 4 | 2019 |
| Test & Evaluation: Prototype Design, Build and Flight Test | 1 | 2018 | 4 | 2018 |
| Test & Evaluation: Non-Recurring Engineering | 1 | 2019 | 4 | 2019 |
| Contract Award: Engineering & Manufacturing Development Contract Award | 1 | 2019 | 1 | 2019 |
| ***V-22 Technology Insetion*** | | | | |
| Modular Avionics Development | 1 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>1425 / *V-22* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Reviews: System Requirements Review | 4 | 2018 | 4 | 2018 |
| Contract Award: Contract Award | 3 | 2018 | 3 | 2018 |
| ***V-22 Multi-Spectral Sensor / Helmet Mounted Display Development*** | | | | |
| Multi-Spectral Sensor Development | 1 | 2018 | 4 | 2023 |
| Helmet Mounted Display Development (HMD) | 1 | 2018 | 4 | 2019 |
| Reviews: Critical Design Review | 3 | 2021 | 3 | 2021 |
| Test & Evaluation: Flight Test | 3 | 2022 | 1 | 2023 |
| Contract Award: Competitive RFP Release | 2 | 2018 | 2 | 2018 |
| Contract Award: Engineering & Manufacturing Development Contract Award | 2 | 2020 | 2 | 2020 |
| ***V-22 Open System Architecture / Cyber Security*** | | | | |
| Modular Avionics Architecture Development | 1 | 2020 | 4 | 2024 |
| Test & Evaluation: Flight Test | 1 | 2020 | 4 | 2021 |
| Test & Evaluation: Aircraft Integration | 1 | 2020 | 2 | 2020 |
| Test & Evaluation: Developmental Testing | 2 | 2020 | 2 | 2021 |
| Test & Evaluation: Operational Testing | 3 | 2021 | 4 | 2021 |
| Contract Award: Contract Award - Option 1 | 4 | 2021 | 4 | 2021 |
| Contract Award: Contract Award - Option 2 | 3 | 2022 | 3 | 2022 |
| Contract Award: Contract Award - Option 3 | 3 | 2023 | 3 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604262N / *V-22A* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 14.485 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 14.485 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Congressional Add. The V-22 Common Configuration-Readiness And Modernization (CC-RAM) Nacelle Improvement funds engineering and manufacturing development efforts that will improve reliability and maintain commonality of nacelle components / structure across all V-22 variants. Planned improvements include improved inlet particle separation via optimization of the Engine Air Particle Separator system, and reliability improvements to the V-22 exhaust system to include aft nacelle structure and infrared suppressor components. Improved inlet particle separation development will provide critical safety and readiness improvements projected to increase engine reliability by a factor of 2x increasing engine /aircraft readiness in austere operational environments. Development of improvements in the aft nacelle will focus on increasing the reliability and maintainability of current aft nacelle structure and infrared compressor components through targeted changes to correct in service revealed deficiencies.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** MV-22 CC-RAM Nacelle Improvements | 14.485 | 0.000 |
| ***FY 2018 Accomplishments:*** Development of an improved inlet particle separation solution will be executed under the current IIS development contract. Development will be focused on improving the efficiency of the EAPS system through increased scavenge ratios, optimization of inlet splitter flow aerodynamic performance, and increased EAPS blower efficiency. Solution will be common to all V-22 variants. Development of improvements to the aft nacelle include detailed design/manufacturing/material improvements to increase reliability and maintainability of the components in service to include the aft nacelle cowling, side panels, infrared transition duct and centerbody, and associated hardware. | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 14.485 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The V-22 is a post Milestone III ACAT-IC program. As a result of mishaps during and subsequent to V-22 Operational Evaluation (Apr and Dec 00), the program was restructured employing a phased approach to return to flight and tactical introduction. The Contractor and Government defined deficient areas within the program/ aircraft requiring correction prior to return to flight. A Block Upgrade approach was planned, with required efforts identified in Block "A", "B", and "C". Block "A" included

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

those efforts necessary to return the V-22 to safe and operational fleet operations. Block "B" included those efforts necessary to improve the effectiveness and suitability of the aircraft. Block "C" includes mission enhancements like weather radar, cabin effectiveness suitability improvements, i.e., Environmental Control System, and Forward Firing ALE-47. Non-recurring development activities are to be initiated and completed for all efforts identified in Block "A", "B", and "C". The Contractor will develop specific Statements of Work and Preliminary Specification Change Notices required to integrate the Block Upgrade efforts into the baseline Program. A Systems Requirements Review, Initial Design Review, and Final Design Review was held for each of the Block efforts so the design maturity could be reviewed and the Government could redirect activities as appropriate. The CV-22 Engineering Manufacturing and Development program is also structured in Blocks to define an evolutionary approach to achieving full operational capability. Block "0" is the initial baseline CV-22 variant. Block "10" enhances mission capability with the addition of terrain following radar, additional fuel tanks, additional radios, and Block "20" includes capabilities such as radio frequency and infrared countermeasures improvements. Additional Blocks are in the planning stages to continue the growth process throughout the operational life of the weapon system. The CMV-22 will add (1) the capability to meet the range requirements that the Carrier Onboard Delivery (COD) mission demands (2) a high frequency radio to transmit/receive beyond line of sight over water and (3) a public address system for use while transporting passengers in support of the COD mission.

**E. Performance Metrics**

Milestone Reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604262N / *V-22A* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

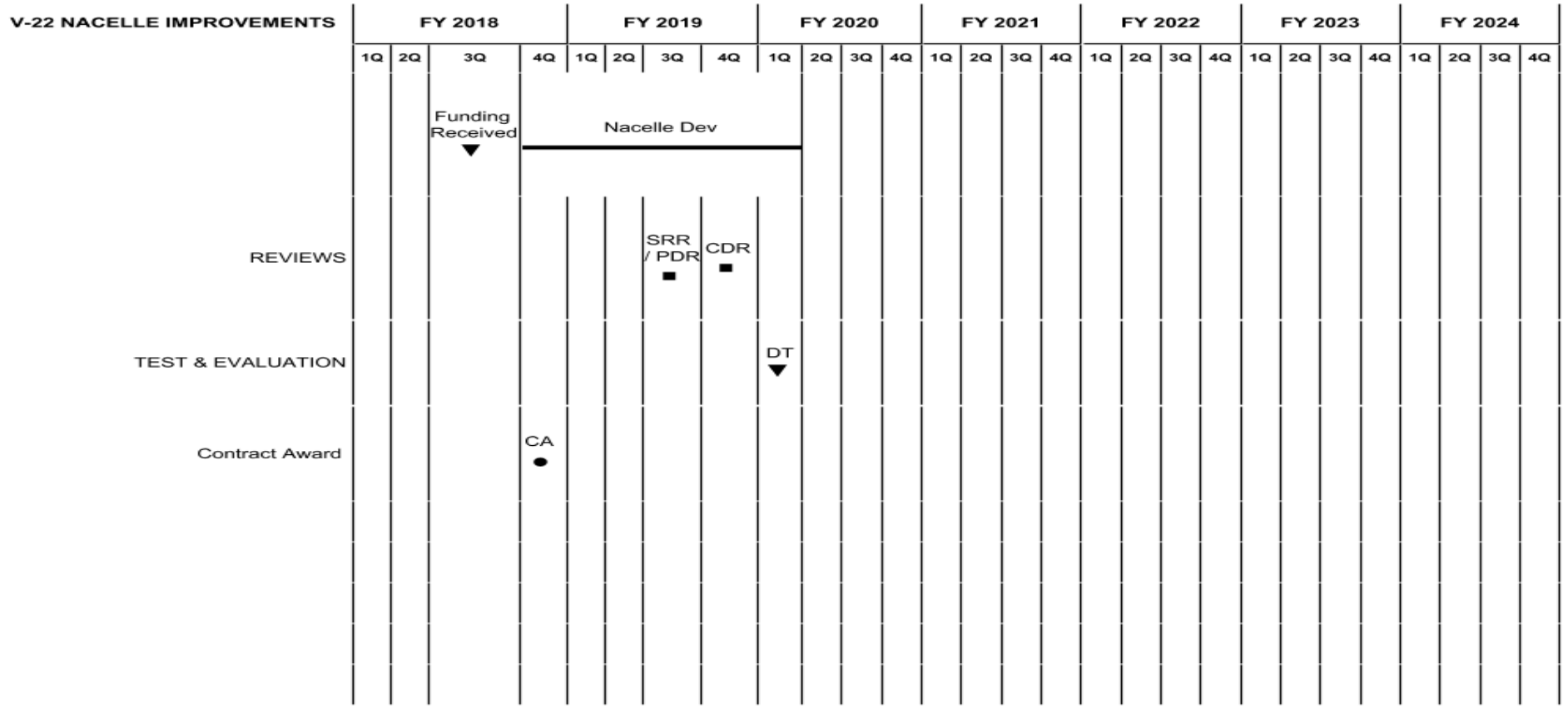
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V-22 Nacelle Improvements | SS/CPIF | Bell Boeing : Ridley Park, PA | 0.000 | 14.485 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.485 | 14.485 |
| | | **Subtotal** | 0.000 | 14.485 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.485 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 14.485 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.485 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604262N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604262N / *V-22A* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***V-22 NACELLE IMPROVEMENTS*** | | | | |
| Funding Received | 3 | 2018 | 3 | 2018 |
| Nacelle Development | 4 | 2018 | 1 | 2020 |
| REVIEWS: System Requirements Review / Preliminary Design Review | 3 | 2019 | 3 | 2019 |
| REVIEWS: Critical Design Review | 4 | 2019 | 4 | 2019 |
| TEST & EVALUATION: Developmental Testing | 1 | 2020 | 1 | 2020 |
| Contract Award: Contract Award | 4 | 2018 | 4 | 2018 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604264N *I Air Crew Systems Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 135.561 | 7.174 | 30.980 | 21.172 | - | 21.172 | 19.932 | 17.566 | 3.013 | 3.072 | Continuing | Continuing |
| 0606: *Aircrew System Development* | 135.561 | 6.247 | 20.980 | 21.172 | - | 21.172 | 19.932 | 17.566 | 3.013 | 3.072 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.927 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.927 |

**A. Mission Description and Budget Item Justification**

The Aircrew Systems Development program provides Engineering and Manufacturing Development of Aviation Life Support Systems to protect aircrew and flight deck personnel from current and future threats including: directed energy weapons, chemical/biological/radiological agents/fallout, ballistic projectiles, temperature extremes, heat/fire, low concentration oxygen environments, high dynamic forces during emergency egress, hearing loss, and high "G" forces. The program also provides development for the following capabilities: night vision capability, hearing and head protection, aircrew endurance, aircrew performance, man mounted data display, communications, clothing, in flight restraint and stability emergency egress and descent, escape and evasion, survival and rescue, crash protection, and anthropometric sizing for small aircrew. Acquisition initiatives include: competition, the application of streamlining initiatives, use of non-developmental items, joint and tri-service developments, and the pursuit of NATO/allied cooperative ventures, which expedite introduction of new products into Navy and Marine Corps fixed and rotary wing aircraft, reduce costs, and promote commonality.

JUSTIFICATION FOR BUDGET ACTIVITY:
This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 13.235 | 20.980 | 20.380 | - | 20.380 |
| Current President's Budget | 7.174 | 30.980 | 21.172 | - | 21.172 |
| Total Adjustments | -6.061 | 10.000 | 0.792 | - | 0.792 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 10.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.403 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 1.000 | - | 1.000 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.208 | - | -0.208 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604264N *I Air Crew Systems Development* | | | |
| • Congressional Directed Reductions | -6.618 | - | - | - | - |
| Adjustments | | | | | |
| • Congressional Add Adjustments | 0.960 | - | - | - | - |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *T-45 and F/A-18 Physiological Episodes* | 0.927 | 0.000 |
| Congressional Add: *Advance Aircrew Physiological Monitoring* | 0.000 | 10.000 |
| Congressional Add Subtotals for Project: 9999 | 0.927 | 10.000 |
| Congressional Add Totals for all Projects | 0.927 | 10.000 |

**Change Summary Explanation**

Schedule:

1. Acquisition Milestones:
A. Laser Eye Protection (LEP) - Milestone B (MS B), Milestone C (MS C), Initial Operational Capability (IOC) and Full Rate Production (FRP) delayed due to extended revision of threat requirement and decision not to procure United States Air Force (USAF) spectacle.

B. Enhanced Visual Acuity (EVA) - MS B and MS C dates changed to reflect revised schedule. Schedule has been postponed due to departmental shifting of priorities.

2. System Development:
A. LEP - System Readiness Review 1 moved from 4Q FY15 to 1Q FY17; System Function Review/System Readiness Review 2 moved from 1Q FY18 to 2Q FY18; Critical Design Review moved from 2Q FY19 to 2Q FY20; Test Readiness Review moved from 4Q FY19 to 4Q FY20; System Verification Review/ Production Readiness Review moved from 2Q FY21 to 4Q FY22; Physical Configuration Audit moved from 1Q FY22 to 4Q FY23.

B. EVA - Moved Preliminary Design Review from 2Q FY19 to 4Q FY20; moved Critical Design Review from 1Q FY20 to 2Q FY21; moved Test Readiness Review from 1Q FY21 to 2Q FY22; moved System Verification Review/Production Readiness Review from 1Q FY22 to 1Q FY23.

3. Test and Evaluation:
A. LEP - Developmental Test shifted from 1Q FY20 to 1Q FY21.

B. EVA - Developmental Test shifted from 3Q FY20 to 2Q FY21; Operational Test shifted from 3Q FY22 to 4Q FY23.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604264N *I Air Crew Systems Development* |

4. Production Milestones:
A. LEP - Engineering Development Model (EDM), Low Rate Initial Production (LRIP) and Full Rate Production (FRP) contract award dates changed to align with milestone decisions.

B. EVA - EDM, LRIP 1 and LRIP 2 contract award dates changed to align with milestone decisions.

5. Deliveries:
A. Laser Eye Protection Spectacles (LEP) - Engineering Development Model (EDM) quantity changed from 62 to 91; Low Rate Initial Production (LRIP) 1 quantity changed from 550 to 350; Full Rate Production (FRP) 1 quantity changed from 665 to 535.

B. Enhanced Visual Acuity (EVA) - EDM quantity changed from 25 to 12; LRIP 1 quantity changed from 6 to 25 and LRIP 2 quantity changed from 64 to 100.

Technical: N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604264N / *Air Crew Systems Development* | Project (Number/Name)<br>0606 / *Aircrew System Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0606: *Aircrew System Development* | 135.561 | 6.247 | 20.980 | 21.172 | - | 21.172 | 19.932 | 17.566 | 3.013 | 3.072 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

AIRCREW SYSTEMS: Laser Eye Protection (LEP), Enhanced Visual Acuity (EVA), and Aircrew Systems (AS).

Under the above projects, LEP provides eye protection solutions that will provide Fixed, Rotary Wing and Patrol pilots and aircrew with multiple wavelength fixed threat and hazard protection during day and night unaided and Night Vision Goggle aided missions. LEP will consist of a suite of products to include spectacles, goggles and visors. The LEP (visor, spectacle or goggle format) is being developed for compatibility with all required USN/USMC Aviation Life Support Equipment as well as cockpit displays, night vision and fire control systems. EVA provides advanced night vision/Head Up Display (HUD) capability to address critical capability gaps in low and no light illumination levels (night vision). EVA will be integrated on current aircraft through a common interface allowing incremental, modular approach to fielding full capability and future upgrades. Future increments will provide enhanced aircrew situational awareness in degraded visual environment. Aircrew Systems includes State of the Art (SOA) and Survival Systems which provides for the yearly evaluation of the survival, clothing and other aircrew systems that provide upgraded performance, fill capability gaps, improve aircrew endurance and performance, safety and enhance survivability.

AIRCRAFT SYSTEMS: Aircraft Systems include studies for Advanced Crash Protection, SOA, and Survival Systems. SOA provides for the yearly evaluation of the survival systems that provide upgraded performance, improve endurance, fill capability gaps and improve performance, safety and enhance survivability.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Aircrew System Development | 5.692 | 20.345 | 20.650 | 0.000 | 20.650 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Laser Eye Protection (LEP) provides Spectacles (both Self Protection and Multi-Wavelength), goggles, step-in visor and Laser Eye Protection Improvement Program (LEPIP) which monitors emerging threats and changes to technology. Enhanced Visual Acuity (EVA) provides advanced night vision/Head Up Display (HUD) capability to address critical capability gaps in low and no light illumination (Night Vision). Future increments will provide enhanced visibility in degraded visual environments. AS includes SOA. | | | | | |
| ***FY 2019 Plans:***<br>Laser Eye Protection (LEP): Continue research and development of the next increment of threat spectacle. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Enhanced Visual Acuity (EVA): Continue critical technology development, receive validated Capability Development Document (CDD), release Request For Proposals (RFP) for Engineering and Manufacturing Development (EMD), receive Milestone B decision and award EMD Contract.<br>State of the Art (SOA): Continue a yearly evaluation and authorization of the survival, clothing, and other aircrew systems items. Identification, testing and approval of items that provide upgraded performance, fill capability gaps, improve aircrew endurance, improve aircrew performance and safety and enhance survivability.<br>Physiological Episode Protection: Mitigate risk of loss of aircrew and Tactical and Training jet platforms due to Physiological Episodes using monitoring and alert systems. Develop, prototype, and test a physiological monitoring system that detects physiological episodes and provides a warning in time to enable the aircrew to execute emergency procedures and recover safely.<br>***FY 2020 Base Plans:***<br>Laser Eye Protection (LEP): Continue research and development of the next increment of threat spectacle, complete Critical Design Review (CDR), complete Technical Readiness Review (TRR), and deliver 91 Engineering Development Models (EDM).<br>Enhanced Visual Acuity (EVA): Continue critical technology development, complete Preliminary Design Review (PDR) and System Requirements Review 2 (SRR2).<br>State of the Art (SOA): Continue a yearly evaluation and authorization of the survival, clothing, and other aircrew systems items. Identification, testing and approval of items that provide upgraded performance, fill capability gaps, improve aircrew endurance, improve aircrew performance and safety and enhance survivability.<br>Physiological Episode Protection: Mitigate risk of loss of aircrew and Tactical and Training jet platforms due to Physiological Episodes using monitoring and alert systems. Develop, prototype, and test a physiological monitoring system that detects physiological episodes and provides a warning in time to enable the aircrew to execute emergency procedures and recover safely.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 Increase due to ramp up of EVA development activity in preparation for Preliminary Design Review (PDR) and continued execution of Engineering and Manufacturing Development (EMD) Contract. | | | | | |
| ***Title:*** Aircraft Systems Development | 0.555 | 0.635 | 0.522 | 0.000 | 0.522 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Aircraft Systems include studies for Advanced Crash Protection, and State of the Art (SOA).<br><br>***FY 2019 Plans:***<br>State of the Art (SOA): Continue a yearly evaluation and authorization to include identification, testing and approval of items that provide upgraded performance, fill capability gaps, improve endurance, improve performance and safety and enhance survivability.<br>Oxygen Cart (Peculiar Support Equipment (PSE)): The Emergency Oxygen Source (EOS) in the F/A-18 Navy Aircrew Common Ejection Seat (NACES) survival kit will be changed to afford the pilot more emergency oxygen in the event of a hypoxia incidence. This change will drive a requirement for PSE O2 servicing cart used to service the EOS cylinder. This part of the effort will develop, prototype and test an oxygen cart to reach the pressures required.<br><br>***FY 2020 Base Plans:***<br>State of the Art (SOA): Continue a yearly evaluation and authorization to include identification, testing and approval of items that provide upgraded performance, fill capability gaps, improve endurance, improve performance and safety and enhance survivability.<br>Oxygen Cart (Peculiar Support Equipment (PSE)): The Emergency Oxygen Source (EOS) in the F/A-18 Navy Aircrew Common Ejection Seat (NACES) survival kit will be changed to afford the pilot more emergency oxygen in the event of a hypoxia incidence. This change will drive a requirement for PSE O2 servicing cart used to service the EOS cylinder. This part of the effort will develop, prototype and test an oxygen cart to reach the pressures required.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Slight decrease from FY 2019 to FY 2020 due to contract services reform. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.247 | 20.980 | 21.172 | 0.000 | 21.172 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4268: *Aviation Life Support* | 41.967 | 14.570 | 32.862 | 0.500 | 33.362 | 34.405 | 38.456 | 49.998 | 50.705 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0575: *Aviation Life Support Mods* | 0.000 | 15.864 | 39.762 | - | 39.762 | 35.397 | 2.666 | 5.885 | 6.034 | 65.386 | 191.362 |

**Remarks**

**D. Acquisition Strategy**

Commercial Off-The-Shelf /Non-Developmental Items where possible, cost type contracts.

**E. Performance Metrics**

Enhanced Visual Acuity: Performance Metrics to include Preliminary Design Review (PDR), Critical Design Review (CDR), Milestone B (MS B), Milestone C (MS C) and IOC.

Laser Eye Protection: Performance Metrics to include System Readiness Review (SRR), Critical Design Review (CDR), Test Readiness Review (TRR), System Verification Review/Production Readiness Review (SVR/PRR), Milestone B (MS B), Milestone C (MS C), Initial Operating Capability (IOC) and Full Rate Production Decision Review (FRPDR).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Eng Laser Eye Protection (LEP) | WR | NAWCAD : Patuxent River, MD | 10.046 | 1.000 | Dec 2017 | 1.000 | Dec 2018 | 1.000 | Dec 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| Systems Eng Laser Eye Protection (LEP) | C/FFP | NAVAIR : Patuxent River, MD | 0.573 | 0.637 | Mar 2018 | 2.100 | Dec 2018 | 1.700 | Dec 2019 | - | | 1.700 | 3.035 | 8.045 | 5.600 |
| Systems Eng Aircrew Systems | WR | Various : Various | 16.433 | 0.538 | Feb 2018 | 0.525 | Dec 2018 | 1.359 | Feb 2020 | - | | 1.359 | Continuing | Continuing | Continuing |
| Systems Eng Aircraft Systems | WR | Various : Various | 44.980 | 0.447 | Feb 2018 | 0.635 | Feb 2019 | 0.522 | Feb 2020 | - | | 0.522 | Continuing | Continuing | Continuing |
| System Eng Enhanced Visual Acuity | C/CPFF | Various : Various | 3.712 | 0.000 | May 2018 | 10.660 | Mar 2019 | 10.761 | Feb 2020 | - | | 10.761 | Continuing | Continuing | Continuing |
| System Eng Enhanced Visual Acuity | WR | Various : Patuxent River, MD | 12.047 | 0.457 | Feb 2018 | 3.313 | Nov 2018 | 2.982 | Dec 2019 | - | | 2.982 | Continuing | Continuing | Continuing |
| Systems Eng Physiological Episode Protection | C/CPFF | TBD : TBD | 0.000 | 2.422 | Nov 2017 | 1.700 | Nov 2018 | 1.800 | Nov 2019 | - | | 1.800 | Continuing | Continuing | Continuing |
| Systems Eng O2 Cart | C/CPFF | NAWCAD : Patuxent River, MD | 0.000 | 0.700 | Feb 2018 | 1.000 | Dec 2018 | 1.000 | Dec 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| Prior year Prod Dev cost no longer funded in the FYDP | Various | Various : Various | 34.569 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 34.569 | - |
| | | **Subtotal** | 122.360 | 6.201 | | 20.933 | | 21.124 | | - | | 21.124 | Continuing | Continuing | N/A |

**Remarks**

FY18 funding Program Delay Mark (Issue 66058) realized ($6.618M).
FY18 funding received ($4.208M) in support of Enhanced Emergency Oxygen Supply (EEOS) and Physiological Episode (PE) Protection.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | Various : Various | 1.278 | 0.046 | Dec 2017 | 0.047 | Dec 2018 | 0.048 | Dec 2019 | - | | 0.048 | Continuing | Continuing | Continuing |
| Prior year Mgmt Svcs no longer funded in the FYDP | Various | Various : Various | 11.923 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.923 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604264N / *Air Crew Systems Development* | Project (Number/Name)<br>0606 / *Aircrew System Development* | |

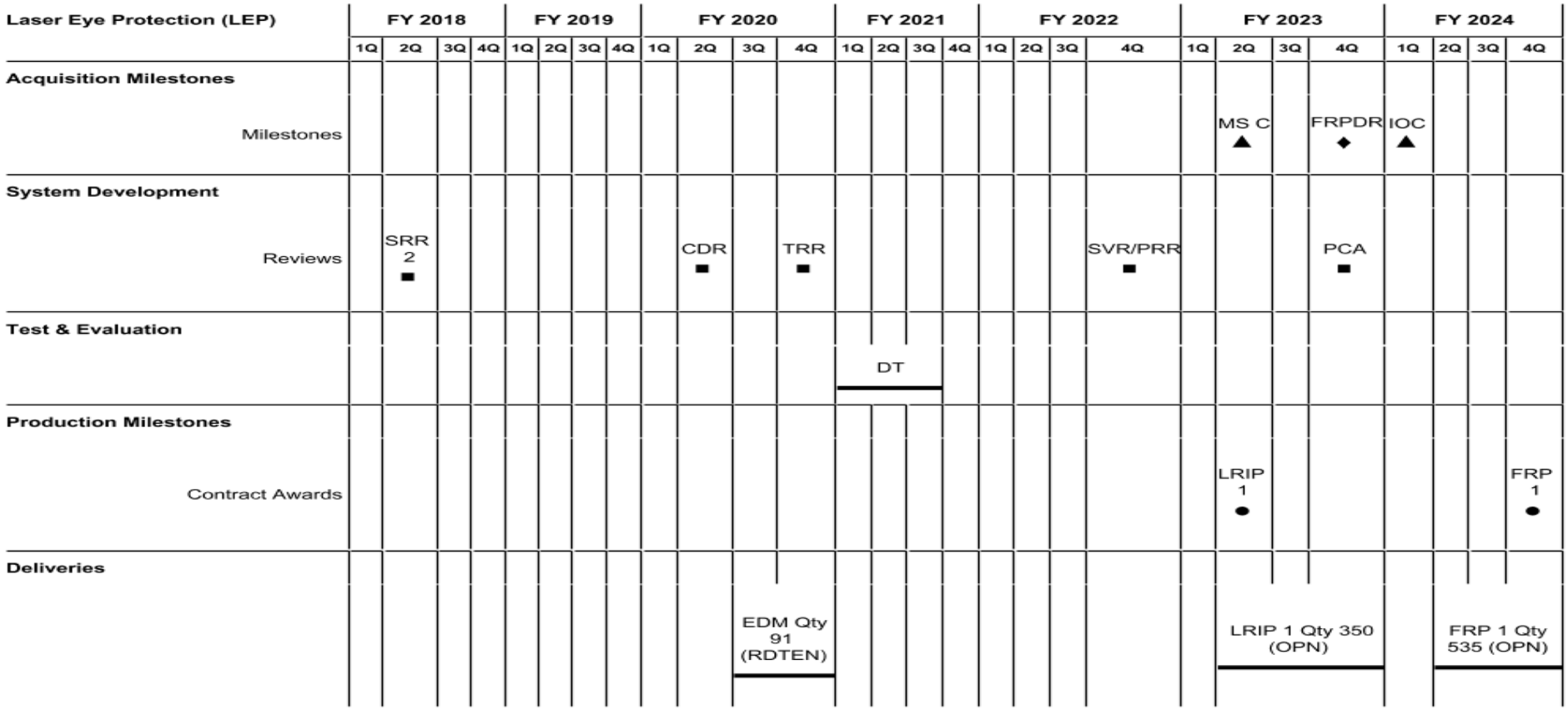
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 13.201 | 0.046 | | 0.047 | | 0.048 | | - | | 0.048 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 135.561 | 6.247 | | 20.980 | | 21.172 | | - | | 21.172 | Continuing | Continuing | N/A |

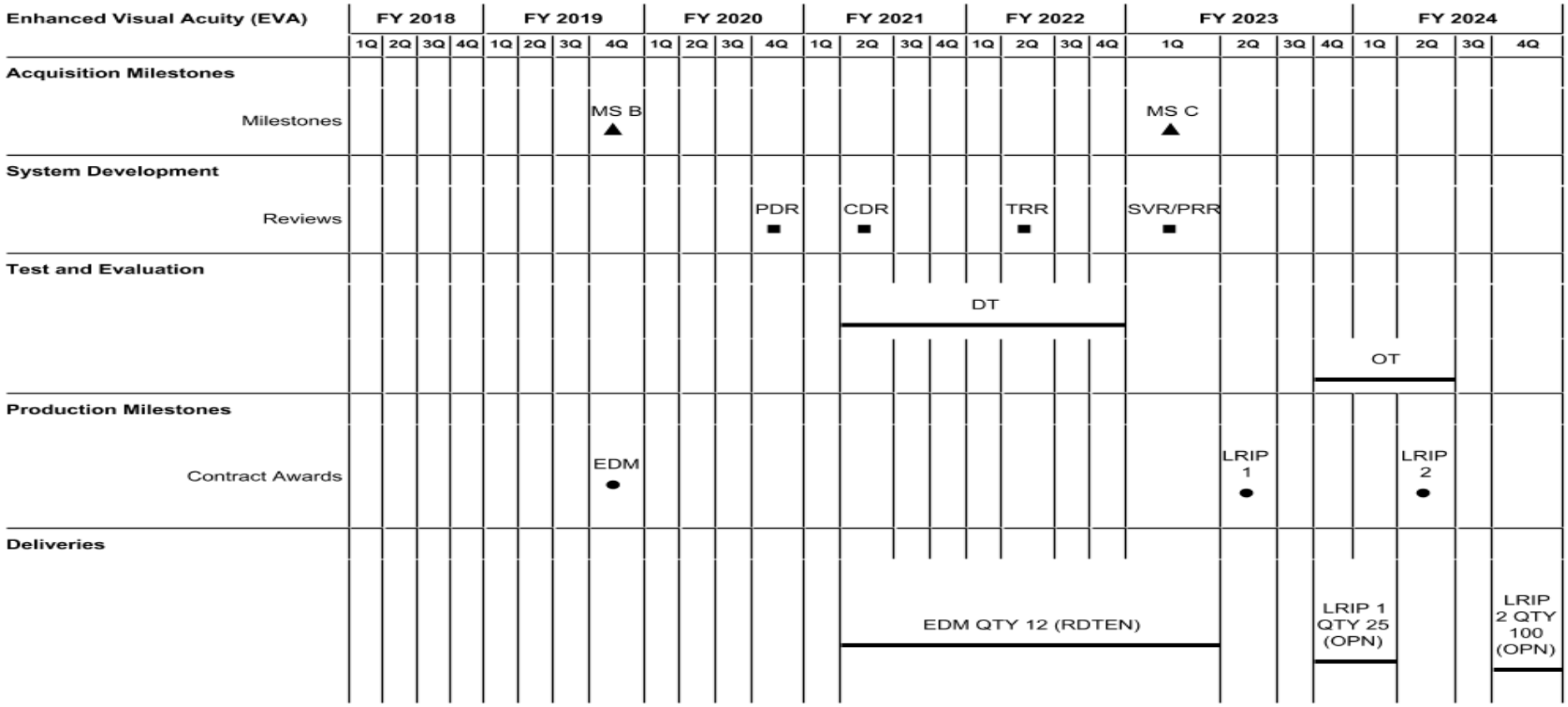
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |




*2020DON - 0604264N - 0606*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |




*2020DON - 0604264N - 0606 EDM Units will be used for Operational Testing*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Laser Eye Protection (LEP)*** | | | | |
| Acquisition Milestones: Milestones: LEP: Milestone C | 2 | 2023 | 2 | 2023 |
| Acquisition Milestones: Milestones: LEP: FRP Decision | 4 | 2023 | 4 | 2023 |
| Acquisition Milestones: Milestones: LEP IOC | 1 | 2024 | 1 | 2024 |
| System Development: Reviews: SRR 2 | 2 | 2018 | 2 | 2018 |
| System Development: Reviews: CDR | 2 | 2020 | 2 | 2020 |
| System Development: Reviews: TRR | 4 | 2020 | 4 | 2020 |
| System Development: Reviews: SVR/PRR | 4 | 2022 | 4 | 2022 |
| System Development: Reviews: PCA | 4 | 2023 | 4 | 2023 |
| Test & Evaluation: DT | 1 | 2021 | 3 | 2021 |
| Production Milestones: Contract Awards: LEP LRIP 1 (OPN) | 2 | 2023 | 2 | 2023 |
| Production Milestones: Contract Awards: LEP FRP 1 (OPN) | 4 | 2024 | 4 | 2024 |
| Deliveries: LEP EDM Qty 91 | 3 | 2020 | 4 | 2020 |
| Deliveries: LEP LRIP Qty 350 | 2 | 2023 | 4 | 2023 |
| Deliveries: LEP FRP 1 Qty 535 | 2 | 2024 | 4 | 2024 |
| ***Enhanced Visual Acuity (EVA)*** | | | | |
| Acquisition Milestones: Milestones: EVA Milestone B | 4 | 2019 | 4 | 2019 |
| Acquisition Milestones: Milestones: EVA Milestone C | 1 | 2023 | 1 | 2023 |
| System Development: Reviews: EVA PDR | 4 | 2020 | 4 | 2020 |
| System Development: Reviews: EVA CDR | 2 | 2021 | 2 | 2021 |
| System Development: Reviews: EVA TRR | 2 | 2022 | 2 | 2022 |
| System Development: Reviews: EVA SVR/PRR | 1 | 2023 | 1 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>0606 / *Aircrew System Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: EVA Developmental Testing | 2 | 2021 | 4 | 2022 |
| Test and Evaluation: EVA Operational Testing | 4 | 2023 | 2 | 2024 |
| Production Milestones: Contract Awards: EDM (RDTEN) | 4 | 2019 | 4 | 2019 |
| Production Milestones: Contract Awards: EVA LRIP 1 (OPN) | 2 | 2023 | 2 | 2023 |
| Production Milestones: Contract Awards: EVA LRIP 2 (OPN) | 2 | 2024 | 2 | 2024 |
| Deliveries: EDM (QTY 12) | 2 | 2021 | 1 | 2023 |
| Deliveries: EVA LRIP 1 (QTY 25) | 4 | 2023 | 1 | 2024 |
| Deliveries: EVA LRIP 2 (QTY 100) | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604264N / *Air Crew Systems Development* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.927 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.927 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

FY19 Base Plans - Proj. 9999 Congressional Add: NAVAIR PMA-202 will work with the Defense Innovation Unit (DIU), a Department of Defense (DoD) organization focused on accelerating commercial technologies in the U.S. Military, to develop wearable physiological monitoring systems and algorithms, as prototypes, to monitor for, predict, and/or alert aircrew to impending degradations in performance. The scope of this project will be consistent with the Research, Development, Test & Evaluation (RDT&E) of physiological monitoring systems.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** T-45 and F/A-18 Physiological Episodes<br>***FY 2018 Accomplishments:*** Physiological Episode Protection: Mitigated risk of loss of aircrew and Tactical and Training jet platforms due to Physiological Episodes using monitoring and alert systems. Developed, prototyped, and tested a physiological monitoring system that detects physiological episodes and provides a warning in time to enable the aircrew to execute emergency procedures and recover safely.<br>***FY 2019 Plans:*** N/A | 0.927 | 0.000 |
| ***Congressional Add:*** Advance Aircrew Physiological Monitoring<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Advance Aircrew Physiological Monitoring. | 0.000 | 10.000 |
| **Congressional Adds Subtotals** | 0.927 | 10.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable.

**E. Performance Metrics**

Not applicable.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604264N / *Air Crew Systems Development* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

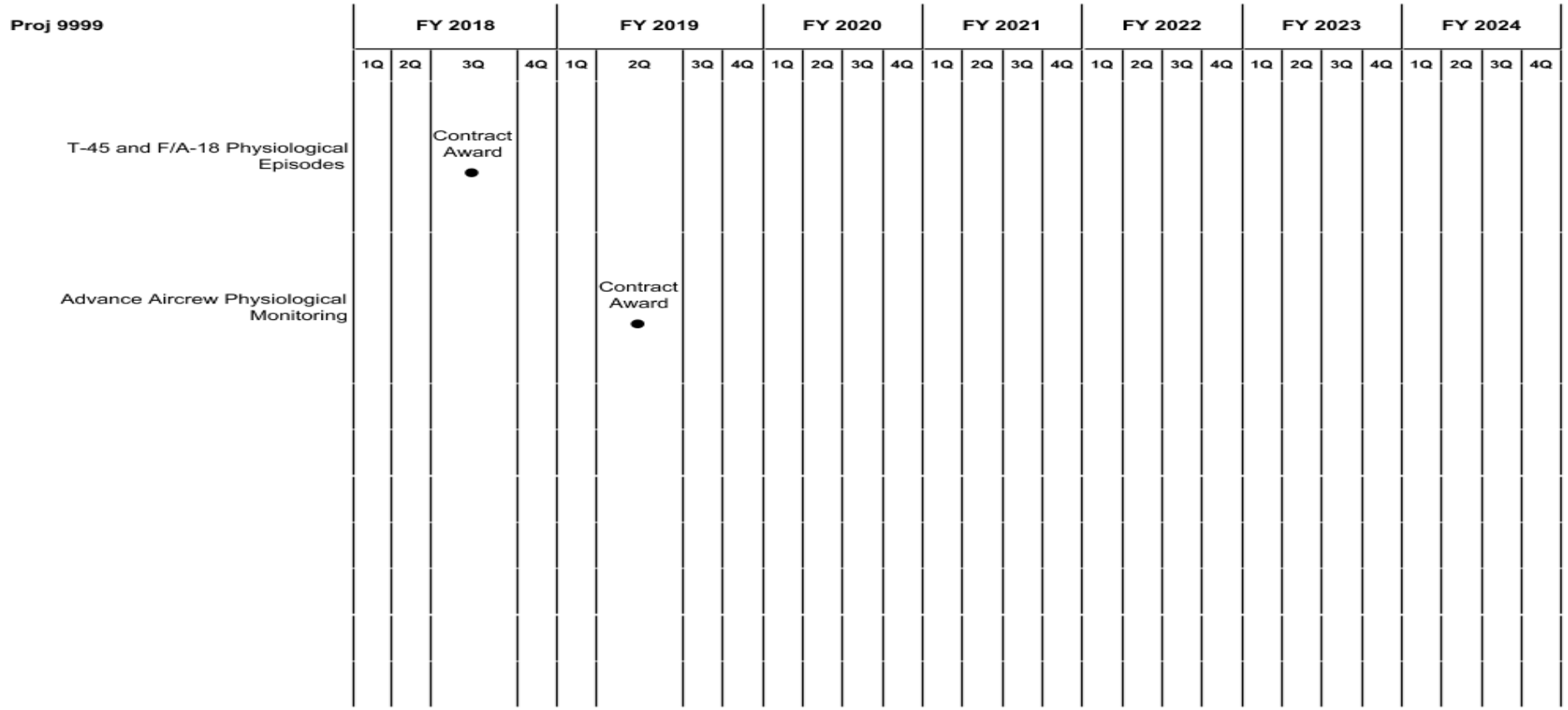
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T-45 and F/A-18 Physiological Episodes | C/CPFF | Various : Various | 0.000 | 0.927 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.927 | - |
| Advance Aircrew Physiological Monitoring | C/CPFF | Various : Various | 0.000 | 0.000 | | 10.000 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 10.000 | 10.000 |
| | | **Subtotal** | 0.000 | 0.927 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.927 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.927 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.927 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604264N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604264N / *Air Crew Systems Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| T-45 and F/A-18 Physiological Episodes: Schedule Detail | 3 | 2018 | 3 | 2018 |
| Advance Aircrew Physiological Monitoring: Schedule Detail | 2 | 2019 | 2 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604269N *I EA-18 Squadrons* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,980.362 | 137.029 | 242.719 | 143.585 | - | 143.585 | 118.535 | 67.546 | 69.981 | 72.985 | Continuing | Continuing |
| 3063: *EA-18G Development* | 1,980.362 | 137.029 | 147.419 | 143.585 | - | 143.585 | 118.535 | 67.546 | 69.981 | 72.985 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 95.300 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 95.300 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 378 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The EA-18G has replaced the EA-6B aircraft as the primary Electronic Attack (EA) platform supporting the Navy and Marine Corps. The EA-18G will be the sole EA aircraft in the inventory. Capabilities of the EA-18G weapon system and ancillary equipment can be upgraded to accommodate and incorporate new or enhanced weapons as well as advances in technology to respond effectively to emerging future threats. EA-18G "Flight Plan" spiral capability development is critical to the baseline of the EA-18G next generation mission system capability and maintaining tactical relevance in support of Navy Aviation Plan 2030. Development continues for design and integration of avionics systems, integration of Jamming Techniques Optimization improvements, evolutionary software upgrades via the System Configuration Set block builds and related testing. Continued advanced development engineering for improvements in reliability and maintainability are required to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability.

The FY 2020 funding request continues improvements to the ALQ-218 Airborne Electronic Attack Systems Enhancements (ASE) and Integrated Capability Package (ICP)-3. This funds a combination hardware/software solution to the ALQ-218 receiver to enable low band geo-location, faster geo-location response times, improved location, identification, and probability of intercept by enabling the EA-18G to detect and identify radio frequency emitters with complex waveforms that typically are not able to be detected or identified using traditional methods. ASE provides foundational capabilities needed to support the ICP-3 passive kill chain. Additional funds added for transitioning Reactive Electronic Attack Measures (REAM) technology from an ONR future Naval capabilities (FNC) science and technology effort to the platform.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 173.488 | 147.419 | 159.472 | - | 159.472 |
| Current President's Budget | 137.029 | 242.719 | 143.585 | - | 143.585 |
| Total Adjustments | -36.459 | 95.300 | -15.887 | - | -15.887 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 95.300 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -4.789 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -15.887 | - | -15.887 |
| • Congressional Directed Reductions Adjustments | -31.670 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *EA-18G Advanced Modes/Cognitive Electronic Warfare Acceleration* | 0.000 | 95.300 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 95.300 |
| Congressional Add Totals for all Projects | 0.000 | 95.300 |

**Change Summary Explanation**

Technical: Not Applicable

Schedule: Not Applicable

The FY 2020 funding request was increased by $0.247 million as a result of a rate adjustment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | | | | Project (Number/Name)<br>3063 / *EA-18G Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3063: *EA-18G Development* | 1,980.362 | 137.029 | 147.419 | 143.585 | - | 143.585 | 118.535 | 67.546 | 69.981 | 72.985 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 378

**A. Mission Description and Budget Item Justification**

The EA-18G is the replacement aircraft for the EA-6B. The EA-18G development program upgrades the EA-6B's Airborne Electronic Attack capability to detect, identify, locate and suppress hostile emitters; provides enhanced connectivity to National, Theater and Strike assets; and provides organic precision emitter targeting for employment of onboard suppression weapons (High-speed Anti-Radiation Missile family) to fulfill operational requirements. The performance of the aircraft is compatible with the primary strike/fighter aircraft projected to be in the inventory, allowing it to be fully integrated into specific strike packages.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** EA-18G Design and Avionics Integration | 61.906 | 66.945 | 125.893 | 0.000 | 125.893 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** The EA-18G has the capability to operate autonomously or as a major node in a network-centric operation and is being designed to perform a range of Electronic Warfare/Electronic Attack functions either simultaneously or independently. Funding will be utilized for design and integration of avionics systems into the EA-18G.

***FY 2019 Plans:***
Continue integration of improvements developed through the Jamming Techniques Optimization teams. Continue and increase engineering, flight hours and test efforts for ALQ-218 Airborne Electronic Attack Systems Enhancements (ASE) upgrade requirements to improve low band geo-location, signal detection, and identification capabilities necessary for complex emitter geo-location and identification. Funds will support a combined hardware/software solution to provide significant capability enhancements to the ALQ-218 which are required to address evolving threats. To incorporate those ALQ-218 ASE upgrades with the SCS fleet releases on EA-18G, an increase in engineering, system integration, SCS development, Operational Flight Program re-hosting, test planning, materials, lab equipment, and lab/flight testing are being funded.

FY19 continues added funding levels to the EA-18G budget to support increased ALQ-218 signal processing capacity and capability by adding the LBDR Capability enhancements enable better detection and correct identification of modern radars. Capacity improvements provide increased signal processing in current day dense electromagnetic environments. Funds will support Transitioning Reactive Electronic Attack Measures

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>3063 / *EA-18G Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| (REAM) technology from a ONR future naval capabilities (FNC) science and technology effort to the platform. This technology and hardware upgrade of the Electronic Attack Unit (EAU) will bring Cognitive Electronic Warfare capability to the platform and is the start to EA-18G BLK II modernization. As well as development and integration of special mission pods in support of BLK II modernization.<br><br>***FY 2020 Base Plans:***<br>Continue integration of improvements developed through the Jamming Techniques Optimization teams. Continue and increase engineering, flight hours and test efforts for ALQ-218 ASE upgrade requirements to improve low band geo-location, signal detection, and identification capabilities necessary for complex emitter geo-location and identification. Funds will support a combined hardware/software solution to provide significant capability enhancements to the ALQ-218 which are required to address evolving threats. To incorporate those ALQ-218 ASE upgrades with the SCS fleet releases on EA-18G, an increase in engineering, system integration, SCS development, Operational Flight Program re-hosting, test planning, materials, lab equipment, and lab/flight testing are being funded.<br><br>FY20 continues funding to support increased ALQ-218 signal processing capacity and capability by adding the LBDR Capability enhancements enable better detection and correct identification of modern radars. Capacity improvements provide increased signal processing in current day dense electromagnetic environments. Funds will support Transitioning REAM technology from a ONR future naval capabilities science and technology effort to the platform. This technology and hardware upgrade of the EAU will bring Cognitive Electronic Warfare capability to the platform and is the start to EA-18G BLK II modernization as well as development and integration of special mission pods in support of BLK II modernization.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 to FY20 increase accounts for the transition of REAM from ONR in alignment with EAU NRE and hardware upgrades to bring Cognitive Electronic Attack capability to the EA-18G. | | | | | |
| ***Title:*** EA-18G Software Development | 15.387 | 15.695 | 1.247 | 0.000 | 1.247 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continued capability enhancements to improve the EA-18G Airborne Electronic Attack capabilities are predominantly realized through evolutionary software upgrades. Funding will be utilized to develop improved software capabilities for the EA-18G through System Configuration Set block software updates. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue System Configuration Set block software development and integration for the EA-18G, specifically System Configuration Set builds H14, H16 and H18. Increase to engineering efforts for integration of active and passive kill chain capabilities and sensors. Funding for Multi System Integration algorithm and sensor developmental efforts also increased at test activities for ongoing modeling and simulation upgrades such as Net Enabled Weapon Controller Interface Model interoperability software and equipment, and Live Virtual Construct interoperability efforts.<br>***FY 2020 Base Plans:***<br>Continue System Configuration Set block software development and integration for the EA-18G, specifically System Configuration Set builds H16 and H18. Increase to engineering efforts for integration of active and passive kill chain capabilities and sensors. Funding for Multi System Integration algorithm and sensor developmental efforts also increased at test activities for ongoing modeling and simulation upgrades such as Net Enabled Weapon Controller Interface Model interoperability software and equipment, and Live Virtual Construct interoperability efforts.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 to FY20 decrease accounts for a realignment within the PU for efforts involving the EA-18G Design and Integration line for REAM, Cognitive EW, and EAU NRE. | | | | | |
| ***Title:*** EA-18G Developmental & Operational Testing | 5.481 | 5.591 | 5.591 | 0.000 | 5.591 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding will be utilized to support required test phases of the EA-18G.<br>***FY 2019 Plans:***<br>Continue operational and integration test of EA-18G avionics upgrades and System Configuration Set block software updates to include Flight Tests conducted in conjunction with various Fleet Exercises (i.e. FLEX-1X).<br>***FY 2020 Base Plans:***<br>Continue operational and integration test of EA-18G avionics upgrades and System Configuration Set block software updates to include Flight Tests conducted in conjunction with various Fleet Exercises (i.e. FLEX-1X).<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** EA-18G Flight Plan Engineering / System Configuration Set Development and Integration | 54.155 | 59.088 | 10.754 | 0.000 | 10.754 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** EA-18G "Flight Plan" spiral capability development is critical to the baseline of the Growler next generation mission system capability. Funding will support the development, test and integration efforts required to maintain tactical relevance in support of Navy Aviation Plan 2030.<br><br>***FY 2019 Plans:***<br>Continue Flight Plan Engineering efforts to include EA-18G improvements necessary for Growler relevance and tactical supremacy; Navy Integrated Fire Control-Counter Air system configuration set requirements to support Navy Integrated Air and Missile Defense capability requirements and enhance EA-18G Cooperative Engagement Capability. Funding supports development (hardware and software), test and integration efforts for Flight Plan requirements such as DTP-N to include Aided Target Recognition, Stationary Target Recognition, Maritime Multiple Target Track and Engagement, Multi-Level Security, Strike Accelerator and Advanced Tactical Data Link; Display Improvements for enhanced sensor integration; PALC; Flight Path Control (Magic Carpet); TDOA, NCCT, and continued updates to Wingman Compatibility improvements.<br><br>***FY 2020 Base Plans:***<br>Continue Flight Plan Engineering efforts to include EA-18G improvements necessary for Growler relevance and tactical supremacy; Navy Integrated Fire Control-Counter Air system configuration set requirements to support Navy Integrated Air and Missile Defense capability requirements and enhance EA-18G Cooperative Engagement Capability. Funding supports development (hardware and software), test and integration efforts for Flight Plan requirements such as DTP-N to include Aided Target Recognition, Stationary Target Recognition, Maritime Multiple Target Track and Engagement, Multi-Level Security, Strike Accelerator and Advanced Tactical Data Link; Display Improvements for enhanced sensor integration; PALC; Flight Path Control (Magic Carpet); TDOA, NCCT, and continued updates to Wingman Compatibility improvements.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 to FY20 decrease accounts for a realignment within the PU for efforts involving the EA-18G Design and Integration line for REAM, Cognitive EW, and EAU NRE. | | | | | |
| ***Title:*** EA-18G Obsolescence Redesign | 0.100 | 0.100 | 0.100 | 0.000 | 0.100 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop and test design modifications to address obsolescence issues.<br><br>***FY 2019 Plans:***<br>Develop and test design modifications to hardware components and software systems in response to EA-18G weapon system and ancillary equipment obsolescence issues.<br><br>***FY 2020 Base Plans:***<br>Develop and test design modifications to hardware components and software systems in response to EA-18G weapon system and ancillary equipment obsolescence issues.<br><br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 137.029 | 147.419 | 143.585 | 0.000 | 143.585 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/05250: *F-18 Series (OSIP 011-10)* | 40.140 | 49.645 | 70.850 | - | 70.850 | 79.334 | 92.008 | 78.422 | 80.086 | 42.336 | 667.406 |
| • RDTEN/1662: *F/A-18 Improvement* | 68.166 | 102.938 | 117.011 | - | 117.011 | 130.334 | 118.228 | 91.397 | 85.524 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The program achieved Full Rate Production in November 2009. Contractual studies are underway for Operational Requirement Document core Block II activities and those efforts will be integrated into the overall EA-18G plan/roadmap as resources permit. EA-18G software upgrades are incrementally developed, integrated and fielded. Software development and integration are coordinated efforts between government activities and industry partners to field capability upgrades to the EA-18G fleet.

**E. Performance Metrics**

Complete incorporation of EA-18G specific upgrades into the System Configuration Set block software builds to meet planned Fleet Release dates.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>3063 / *EA-18G Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering (SCS/Flight Plan) | WR | NAWCAD : Pax River, MD | 36.194 | 6.250 | Dec 2017 | 19.260 | Dec 2018 | 22.080 | Dec 2019 | - | | 22.080 | Continuing | Continuing | Continuing |
| Systems Engineering (SCS/Flight Plan) | WR | NAWCWD : China Lake, CA | 108.110 | 13.692 | Dec 2017 | 30.373 | Dec 2018 | 27.180 | Dec 2019 | - | | 27.180 | Continuing | Continuing | Continuing |
| Systems Engineering (SCS/Flight Plan) | WR | NAWCWD : Pt. Mugu, CA | 86.155 | 16.492 | Dec 2017 | 25.476 | Dec 2018 | 22.604 | Dec 2019 | - | | 22.604 | Continuing | Continuing | Continuing |
| Systems Engineering (SCS/Flight Plan) | WR | NSMA : Various | 0.250 | 4.113 | Apr 2018 | 4.755 | Apr 2019 | 4.472 | Apr 2020 | - | | 4.472 | Continuing | Continuing | Continuing |
| Systems Engineering (Flight Plan DTP-N) | C/CPFF | Boeing : St. Louis, MO | 38.049 | 8.400 | Mar 2018 | 10.368 | Mar 2019 | 10.575 | Mar 2020 | - | | 10.575 | Continuing | Continuing | Continuing |
| System Engineering (Flight Plan TDOA) | C/IDIQ | Boeing : St. Louis, MO | 2.343 | 6.955 | Dec 2017 | 3.833 | Dec 2018 | 3.910 | Dec 2019 | - | | 3.910 | Continuing | Continuing | Continuing |
| System Engineering (Flight Plan TDOA) | C/CPFF | Northrop Grumman : Various | 1.013 | 14.966 | Dec 2017 | 7.066 | Dec 2018 | 8.527 | Dec 2019 | - | | 8.527 | Continuing | Continuing | Continuing |
| System Engineering (ALQ-218 ASE) | C/IDIQ | Northrop Grumman : Various | 51.971 | 21.277 | Apr 2018 | 7.271 | Apr 2019 | 7.633 | Apr 2020 | - | | 7.633 | Continuing | Continuing | Continuing |
| Systems Engineering (ALQ-218 ASE) | C/CPFF | Boeing : Various | 3.074 | 11.647 | Apr 2018 | 4.985 | Apr 2019 | 5.549 | Apr 2020 | - | | 5.549 | Continuing | Continuing | Continuing |
| Systems Engineering (ALQ-218 LBDR) | WR | NAWCWD : Pt. Mugu, CA | 0.000 | 1.500 | Dec 2017 | 1.300 | Dec 2018 | 0.965 | Dec 2019 | - | | 0.965 | Continuing | Continuing | Continuing |
| Systems Engineering (ALQ-218 LBDR) | WR | NAWCWD : China Lake, CA | 0.000 | 1.000 | Dec 2017 | 1.020 | Dec 2018 | 0.912 | Dec 2019 | - | | 0.912 | Continuing | Continuing | Continuing |
| Systems Engineering (ALQ-218 LBDR) | C/IDIQ | Northrop Grumman : Various | 0.000 | 8.825 | Dec 2017 | 6.000 | Dec 2018 | 4.870 | Dec 2019 | - | | 4.870 | Continuing | Continuing | Continuing |
| Systems Engineering (ALQ-218 LBDR) | C/IDIQ | Boeing : Various | 0.000 | 1.400 | Dec 2017 | 1.400 | Dec 2018 | 1.228 | Dec 2019 | - | | 1.228 | Continuing | Continuing | Continuing |
| Prior Year Prod Dev no longer funded in FYDP | Various | Various : Various | 1,104.103 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,104.103 | - |
| | | **Subtotal** | 1,431.262 | 116.517 | | 123.107 | | 120.505 | | - | | 120.505 | Continuing | Continuing | N/A |

**Remarks**

Funding increases are for Integrated Capability Package-3 (ICP-3) Flight Plan/SCS efforts as well as ALQ-218 Airborne Electronic Attack Systems Enhancements (ASE), which includes Low-Band Dedicated Receiver (LBDR). ICP-3 Flight Plan/SCS efforts include systems engineering, improvement, design and integration efforts for Digital Targeting Processor - Networked (DTP-N) and Network Centric Collaborative Targeting (NCCT). Funding increases also support REAM and Electronic Attack Unit (EAU) NRE.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>3063 / *EA-18G Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Obsolescence Redesign | Various | Various : Various | 0.380 | 0.100 | Jun 2018 | 0.100 | Jun 2019 | 0.100 | Jun 2020 | - | | 0.100 | Continuing | Continuing | Continuing |
| Flight Plan Engineering/ SCS Development and Integration | Various | Various : Various | 5.761 | 3.637 | Dec 2017 | 4.568 | Dec 2018 | 4.344 | Dec 2019 | - | | 4.344 | Continuing | Continuing | Continuing |
| Flight Plan: ICP-3 | Various | Various : Various | 0.000 | 4.000 | Dec 2017 | 4.320 | Dec 2018 | 4.406 | Dec 2019 | - | | 4.406 | 0.000 | 12.726 | - |
| Prior Year Support no longer funded in FYDP | Various | Various : Various | 235.789 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 235.789 | - |
| | | **Subtotal** | 241.930 | 7.737 | | 8.988 | | 8.850 | | - | | 8.850 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration & Operational Testing | WR | Various : Various | 117.725 | 3.731 | Jun 2018 | 6.102 | Jun 2019 | 5.624 | Jun 2020 | - | | 5.624 | Continuing | Continuing | Continuing |
| Integration & Operational Testing | WR | COTF : China Lake, CA | 0.600 | 6.819 | Dec 2017 | 6.955 | Dec 2018 | 6.224 | Dec 2019 | - | | 6.224 | Continuing | Continuing | Continuing |
| Prior Year T&E no longer funded in FYDP | Various | Various : Various | 108.533 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 108.533 | - |
| | | **Subtotal** | 226.858 | 10.550 | | 13.057 | | 11.848 | | - | | 11.848 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support (Seaport-CSS) | C/CPFF | Wyle Lab : Pax River, MD | 15.155 | 0.185 | Apr 2018 | 0.188 | Apr 2019 | 0.191 | Apr 2020 | - | | 0.191 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 34.027 | 0.435 | Dec 2017 | 0.443 | Dec 2018 | 0.451 | Dec 2019 | - | | 0.451 | Continuing | Continuing | Continuing |
| Program Management Support | WR | NAWCAD : Pax River, MD | 23.808 | 0.337 | Dec 2017 | 0.343 | Dec 2018 | 0.335 | Dec 2019 | - | | 0.335 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>3063 / *EA-18G Development* | |

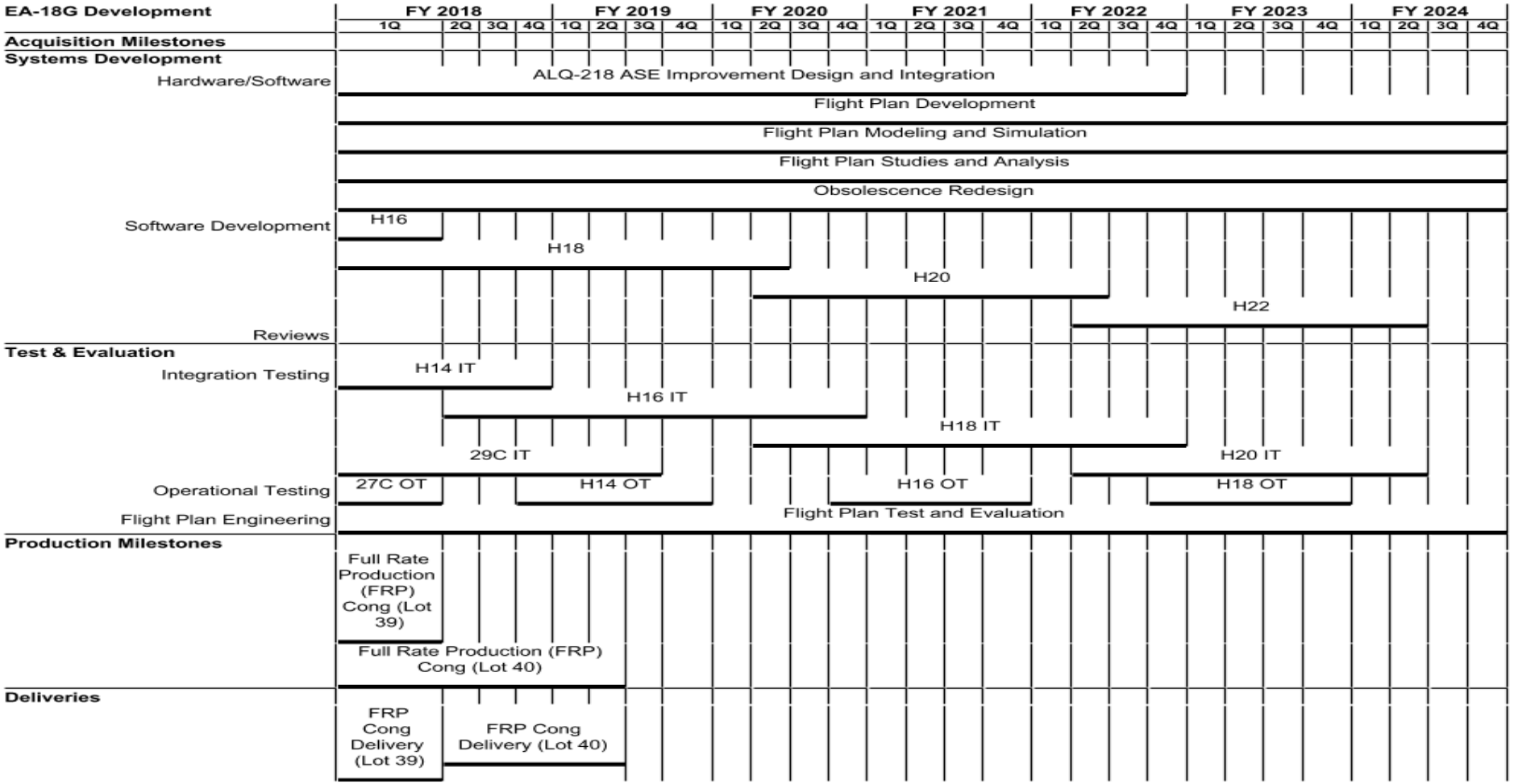
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flight Plan Engineering / System Configuration Set Development & Integration | WR | NAWCAD : Pax River, MD | 2.200 | 0.750 | Dec 2017 | 0.765 | Dec 2018 | 0.780 | Dec 2019 | - | | 0.780 | Continuing | Continuing | Continuing |
| Flight Plan Engineering / System Configuration Set Development & Integration | WR | NAWCWD : China Lake, CA | 0.940 | 0.424 | Dec 2017 | 0.433 | Dec 2018 | 0.531 | Dec 2019 | - | | 0.531 | Continuing | Continuing | Continuing |
| Travel | WR | Various : Various | 2.841 | 0.094 | Dec 2017 | 0.095 | Dec 2018 | 0.094 | Dec 2019 | - | | 0.094 | Continuing | Continuing | Continuing |
| Prior Year Mgmt Svcs no longer funded in FYDP | Various | Various : Various | 1.341 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.341 | - |
| | | **Subtotal** | 80.312 | 2.225 | | 2.267 | | 2.382 | | - | | 2.382 | Continuing | Continuing | N/A |

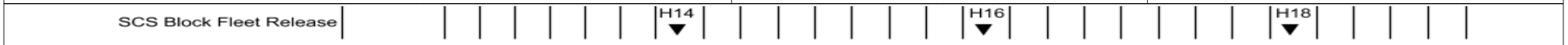
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,980.362 | 137.029 | | 147.419 | | 143.585 | | - | | 143.585 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |




*2020OSD - 0604269N - 3063*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***EA-18G Development*** | | | | |
| Systems Development: Hardware/Software: ALQ-218 ASE Improvement Design and Integration | 1 | 2018 | 4 | 2022 |
| Systems Development: Hardware/Software: Flight Plan Development | 1 | 2018 | 4 | 2024 |
| Systems Development: Hardware/Software: Flight Plan Modeling and Simulation | 1 | 2018 | 4 | 2024 |
| Systems Development: Hardware/Software: Flight Plan Studies and Analysis | 1 | 2018 | 4 | 2024 |
| Systems Development: Hardware/Software: Obsolescence Redesign Development and Testing | 1 | 2018 | 4 | 2024 |
| Systems Development: Software Development: H16 Software Development | 1 | 2018 | 1 | 2018 |
| Systems Development: Software Development: H18 Software Development | 1 | 2018 | 2 | 2020 |
| Systems Development: Software Development: H20 Software Development | 2 | 2020 | 2 | 2022 |
| Systems Development: Software Development: H22 Software Development | 2 | 2022 | 2 | 2024 |
| Test & Evaluation: Integration Testing: H14 Integration Testing | 1 | 2018 | 4 | 2018 |
| Test & Evaluation: Integration Testing: H16 Integration Testing | 2 | 2018 | 4 | 2020 |
| Test & Evaluation: Integration Testing: H18 Integration Testing | 2 | 2020 | 4 | 2022 |
| Test & Evaluation: Integration Testing: H20 Integration Testing | 2 | 2022 | 2 | 2024 |
| Test & Evaluation: Integration Testing: 29C Integration Testing | 1 | 2018 | 3 | 2019 |
| Test & Evaluation: Operational Testing: 27C Operational Testing | 1 | 2018 | 1 | 2018 |
| Test & Evaluation: Operational Testing: H16 Operational Testing | 4 | 2020 | 4 | 2021 |
| Test & Evaluation: Operational Testing: H14 Operational Testing | 4 | 2018 | 4 | 2019 |
| Test & Evaluation: Operational Testing: H18 Operational Testing | 4 | 2022 | 4 | 2023 |
| Test & Evaluation: Flight Plan Engineering: Developmental, Integration and Operational Testing | 1 | 2018 | 4 | 2024 |
| Production Milestones: Full Rate Production - Congressional add Lot 39 | 1 | 2018 | 1 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>3063 / *EA-18G Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: Full Rate Production - Congressional add Lot 40 | 1 | 2018 | 2 | 2019 |
| Deliveries: FRP Cong Delivery (Lot 39) | 1 | 2018 | 1 | 2018 |
| Deliveries: FRP Cong Delivery (Lot 40) | 2 | 2018 | 2 | 2019 |
| Deliveries: SCS Block Fleet Release: H16 Fleet Release | 4 | 2021 | 4 | 2021 |
| Deliveries: SCS Block Fleet Release: H18 Fleet Release | 4 | 2023 | 4 | 2023 |
| Deliveries: SCS Block Fleet Release: H14 Fleet Release | 4 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 95.300 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 95.300 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

FY 19 Congressional Add: EA-18G Advanced Modes/Cognitive Electronic Warfare (EW) Acceleration. Reactive Electronic Attack Measures (REAM) uses cognitive EW machine learning algorithms to provide the warfighter with capabilities to counter advanced dynamic IADS by detecting and identifying unknown adaptive radar emitters. Advanced Modes Phases 1 and 2 are foundational building blocks needed to support REAM via jammer technique management enhancements. REAM autonomously derives effective countermeasures against new, agile, unknown threats, prioritizes threats in a dense EM environment, and dynamically allocates EW resources in one-on-many scenarios. REAM accomplishes this by implementing machine learning logic, automated use of effective EA techniques, and SW/HW upgrades.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** EA-18G Advanced Modes/Cognitive Electronic Warfare Acceleration | 0.000 | 95.300 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** FY19 funds EA-18G Advanced Modes/Cognitive EW/REAM risk reduction studies to support hardware development, REAM Electronic Attack Unit (EAU) Software environment, mission planning/post mission support, REAM Cybersecurity, Cognitive Mission Computing (CMC) Enhancements, as well as threat projection and system impacts. | | |
| **Congressional Adds Subtotals** | 0.000 | 95.300 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0525: *Advanced Modes/Cognitive EW* | 0.000 | 13.900 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 13.900 |

**Remarks**

**D. Acquisition Strategy**

Contractual efforts are underway for determination of EA-18G Advanced Modes/Cognitive EW/REAM hardware solutions, risk reduction efforts, and software development. These efforts are coordinated between government activities and industry partners.

**E. Performance Metrics**

Complete requisite requirements to begin Engineering Manufacturing Development phase for EA-18G Advanced Modes/Cognitive EW/REAM.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H18 SOR | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 15.379 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 15.379 | - |
| REAM Hardware Phase I | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 5.150 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 5.150 | - |
| REAM Risk Reduction | WR | NAVSEA : Crane, IN | 0.000 | 0.000 | | 10.915 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 10.915 | - |
| Systems Engineering (REAM) | WR | NSMA : Various | 0.000 | 0.000 | | 14.000 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 14.000 | - |
| Hardware Development | C/IDIQ | NGC : Various | 0.000 | 0.000 | | 15.000 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 15.000 | 15.000 |
| REAM Hardware Phase I | C/BOA | NGC : Various | 0.000 | 0.000 | | 6.555 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 6.555 | 6.555 |
| REAM Risk Reduction | C/IDIQ | NGC : Various | 0.000 | 0.000 | | 10.985 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 10.985 | 10.985 |
| Systems Engineering (REAM) | WR | NAWCAD : Pax River, MD | 0.000 | 0.000 | | 8.841 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 8.841 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 86.825 | | 0.000 | | - | | 0.000 | 0.000 | 86.825 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CD-3 Integration & Test Support | WR | NAWCWD : Pt. Mugu, CA | 0.000 | 0.000 | | 0.400 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| Engineering & Logistics Support | WR | NAVSEA : Crane, IN | 0.000 | 0.000 | | 1.000 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.000 | - |
| REAM Block II Support | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 0.750 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.750 | 0.750 |
| | | **Subtotal** | 0.000 | 0.000 | | 2.150 | | 0.000 | | - | | 0.000 | 0.000 | 2.150 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration & Operational Testing | WR | Various : Various | 0.000 | 0.000 | | 0.275 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.275 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604269N / *EA-18 Squadrons* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration & Operational Testing | C/FFP | NGC : Various | 0.000 | 0.000 | | 3.000 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.000 | 3.000 |
| Integration & Operational Testing (CLATS) | C/CPFF | Dynetics : Various | 0.000 | 0.000 | | 2.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.500 | 2.500 |
| | | **Subtotal** | 0.000 | 0.000 | | 5.775 | | 0.000 | | - | | 0.000 | 0.000 | 5.775 | N/A |

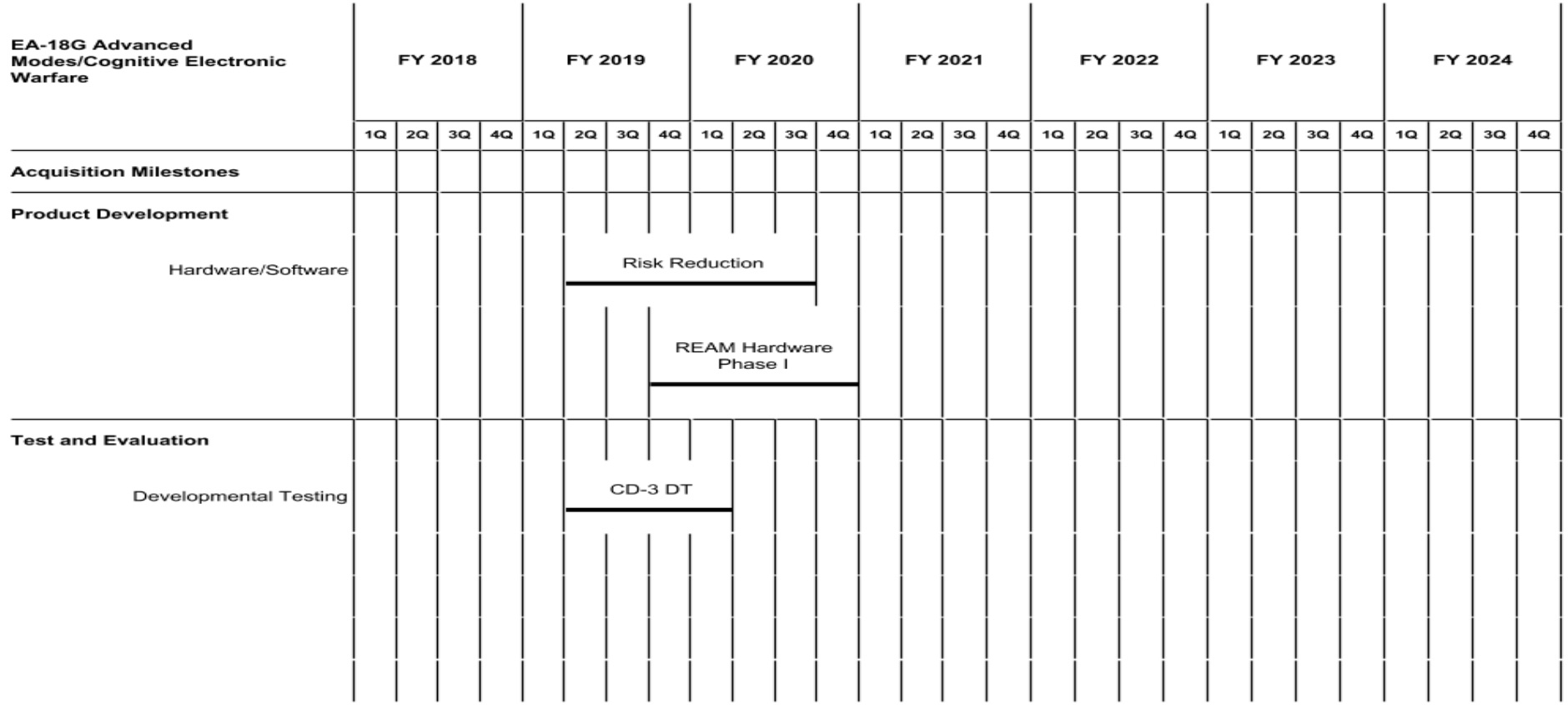
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Pax River, MD | 0.000 | 0.000 | | 0.250 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| Government Engineering Support | WR | NAWCWD : Pt. Mugu | 0.000 | 0.000 | | 0.300 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.550 | | 0.000 | | - | | 0.000 | 0.000 | 0.550 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 95.300 | | 0.000 | | - | | 0.000 | 0.000 | 95.300 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604269N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604269N / *EA-18 Squadrons* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***EA-18G Advanced Modes/Cognitive Electronic Warfare*** | | | | |
| Product Development: Hardware/Software: Risk Reduction | 2 | 2019 | 3 | 2020 |
| Product Development: Hardware/Software: REAM Hardware Phase I | 4 | 2019 | 4 | 2020 |
| Test and Evaluation: Developmental Testing: Capability Demonstration 3 | 2 | 2019 | 1 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604270N *I Electronic Warfare (EW) Dev* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,012.976 | 50.613 | 83.624 | 116.811 | - | 116.811 | 190.776 | 129.585 | 111.598 | 113.817 | Continuing | Continuing |
| 0556: *EW Counter Response* | 488.927 | 16.174 | 17.040 | 44.307 | - | 44.307 | 99.451 | 39.562 | 32.581 | 33.232 | Continuing | Continuing |
| 1742: *EW Technical Development and T&E* | 4.047 | 1.064 | 1.833 | 1.764 | - | 1.764 | 1.614 | 1.650 | 1.684 | 1.718 | Continuing | Continuing |
| 2175: *Tactical Air Electronic Warfare* | 498.786 | 2.091 | 45.074 | 48.624 | - | 48.624 | 71.093 | 71.179 | 52.270 | 53.311 | 0.000 | 842.428 |
| 3308: *Technology Development* | 0.000 | 2.276 | 6.108 | 6.238 | - | 6.238 | 8.444 | 8.614 | 8.776 | 8.950 | Continuing | Continuing |
| 3309: *Assault Survivability Optimization* | 3.484 | 0.848 | 0.836 | 6.910 | - | 6.910 | 0.842 | 0.861 | 0.878 | 0.895 | Continuing | Continuing |
| 3327: *MAGTF EW Aviation Development* | 16.115 | 23.551 | 12.362 | 7.677 | - | 7.677 | 8.136 | 6.717 | 14.382 | 14.664 | Continuing | Continuing |
| 3371: *MAGTF EW Interoperability Development* | 1.617 | 1.609 | 0.371 | 1.291 | - | 1.291 | 1.196 | 1.002 | 1.027 | 1.047 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 3.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.000 |

**Program MDAP/MAIS Code:**
**Project MDAP/MAIS Code(s):** 418

**A. Mission Description and Budget Item Justification**

This program element includes development of Electronic Warfare (EW) systems for the United States Navy (USN), United States Marine Corps (USMC), and United States Army tactical aircraft, USMC helicopters, surface combatants, data link vulnerability assessments, precision targeting, USN and USMC radio frequency jammers, and development and testing of electronic warfare devices for emerging threats and emergency contingencies. This element also includes development of hardware/software solutions that link on-board integrated Aircraft Survivability Equipment (iASE) that are compatible with mission planning information and systems as well as studies and evaluations of current and future aircraft threats, modeling and simulation for improved countermeasure capabilities, and development and testing to address new and emerging threats. The projects in this element improve the ability of the Joint Force to strike diverse targets inside adversary air and missile defense networks to destroy mobile power-projection platforms and enhance close combat lethality in complex terrain.
This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

Project Unit 2175 Tactical Air Electronic Warfare Cost to Complete should read $4.331 Million. Total Cost should read $846.760 Million.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604270N *I Electronic Warfare (EW) Dev* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 54.055 | 89.824 | 127.108 | - | 127.108 |
| Current President's Budget | 50.613 | 83.624 | 116.811 | - | 116.811 |
| Total Adjustments | -3.442 | -6.200 | -10.297 | - | -10.297 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -6.200 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -5.929 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.511 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 4.500 | - | 4.500 |
| • Rate/Misc Adjustments | -0.002 | 0.000 | -14.797 | - | -14.797 |
| • Congressional Add Adjustments | 3.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Intrepid Tiger II (V)3 UH-1Y Jettison Capability* | 3.000 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 3.000 | 0.000 |
| Congressional Add Totals for all Projects | 3.000 | 0.000 |

**Change Summary Explanation**

Project Unit 3327: The FY 2020 funding request was reduced by $5.600 million to account for the availability of prior year execution balances.

Cost:

Project Unit 3309 / Assault Survivability Optimization: Increase from FY 2019 to FY 2020 is $6.1M to address existing, known survivability shortfalls in USMC platforms to defeat current and emerging advanced missile threats that if not addressed will result in loss of aircrew and aircraft.

Technical:

Project Unit 3309 / Assault Survivability Optimization: FY 2020 added effort to address shortfalls in test equipment to evaluate countermeasure effectiveness against advanced threats in multiple spectrums, including UV (ultra-violet), VIS (visible), and IR (infra-red).

Schedule:

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604270N *I Electronic Warfare (EW) Dev* |

Project Unit 0556 / EW COUNTER RESPONSE: N/A

Project Unit 1742 / EW Technical Development and T&E: N/A

Project Unit 2175 / Tactical Air Electronic Warfare: ALQ-214 SW Improvement Fleet Release was changed to a Fielding Decision 3rd Qtr. FY 2019 due to test range availability and software progression, this extend development and integrated testing. Additional Integrated Testing on the F/A-18 C/Daircraft will begin in 1st Qtr. FY 2020 extending into 2nd Qtr. FY 2020. ALQ-214 ARC strategy was further defined to include two phases and accelerate fielding a capability. Phase 1 ARC development addresses the requirements to mitigate potential risks associated with the software development program. The Phase 2 ARC contract award will follow the Requirements Definition phase and satisfy the ARC Development and Aircraft Integration requirement. Dual Band Decoy (DBD) Acquisition Strategy was approved to provide for Early Operational Capability to address emerging threats. DBD prototyping replaced DBD development, with DBD EMD contract and production contract to follow the prototyping phase. DBD Production Milestones added for Low Rate Initial Production (LRIP) and Full Rate Production (FRP) 1 in 2nd Qtr. FY 2022 and 2nd Qtr. FY 2023 respectively, supporting a DBD Initial Operational Capability in 4th Qtr. FY 2023.

Project Unit 3308 / Technology Development: Milestones: Contract Awards: ARC Risk Reduction Contract award added to 3rd Qtr. FY 2018. FY 2018 Operational Flight Program delayed one year. FY 2019 Operational Flight Program changed from 2nd Qtr. FY 2019 to 4th Qtr. FY 2019. FY 2019 and FY 2020 Target Generator delayed one year. All Contract Awards delayed due to Reprioritization of fiscal and manpower resources to meet emergent fleet needs.
Test and Evaluation: Suite Level ECM Testing added to 4th Qtr. FY 2018 through 1st Qtr. FY 2019 and 2nd Qtr. FY 2020 through 1st Qtr. FY 2021. Threat Simulation and Test Assets: Digital Radio Frequency Memory (DRFM) Target Generator Development, DRFM Target Generator Integration and Testing, IDECM Model Development, FY 2022 IDECM Model Lab Integration and FY 2023 IDECM Model Lab Integration delayed one year due to reprioritization of fiscal and manpower resources to meet emergent fleet needs.

Project Unit 3309 / Assault Survivability Optimization: FY 2018 flight test changed from 2nd/3rd Qtr to 4th Qtr due to test range availability. FY18 Test Mission Data File (MDF) changed from 2nd Qtr to 3rd Qtr to align with flight test. Added Radio Frequency Countermeasure (Chaff) fight test for MH-60 2nd Qtr 2018. Initiated modeling and simulation and engineering and evaluation to determine applicability of 1x1x8 countermeasures on Navy aircraft platforms. Updated FY 2019 schedule to reflect ground to air flight test for F/A-18E/F using advanced 1X1X8 countermeasures. FY 2019 to FY 2020 increase of $6.1M prioritized by USMC to fill existing, known capability shortfalls to address critical gaps in survivability against current and emerging threat systems thereby endangering USMC platforms. FY 2020 includes advanced countermeasure dispense techniques optimization modeling and simulation, test MDF development, countermeasure dispense techniques optimization flight test and optimized operational MDF release for AH-1Z/UH-1Y and MV-22 to address survivability shortfalls against advanced missile threats. FY 2020 modeling and simulation funding supports the development of advanced countermeasure techniques prior to air to air flight test for F/A-18 and ground to air flight test for AH-1Z/UH-1Y and MV-22. Schedule includes efforts to improve test and measurement equipment and to develop advanced countermeasures to defeat infrared and radio frequency threats.

Project Unit 3327 / MAGTF EW Aviation Development: AN/ALQ-231(V)1 BLK X TD Flight Release moved from 2nd Qtr FY 2020 to 1st Qtr FY 2021; AN/ALQ-231(V)1 BLK X Software Development completion moved from 2nd Qtr FY 2019 to 2nd Qtr FY 2020; Advanced Technology Software Development

moved from 3rd Qtr FY 2020 to 2nd Qtr FY 2021; AN/ALQ-231(V)1 BLK X Developmental test completion moved from 1st Qtr FY 2019 to 1st Qtr FY 2021; AN/ALQ-231(V)1 BLK X OT&E completion moved from 4th Qtr FY 2019 to 2nd Qtr FY 2021. AN/ALQ-231(V)1 BLK X production awards all slid 1 year.

Project Unit C327 / Intrepid Tiger II (V)3 UH-1Y Jettison Capability: Congressional Add in FY 2018.

Project Unit 3371 / Spiral 2 request for proposal added from 1QTR FY20 to 2QTR FY20 to support transition of Spiral 2 to Program of Record

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>0556 / *EW Counter Response* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0556: *EW Counter Response* | 488.927 | 16.174 | 17.040 | 44.307 | - | 44.307 | 99.451 | 39.562 | 32.581 | 33.232 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Jammer Techniques Optimization (JATO) organization produces the jamming techniques and Electronic Attack (EA) optimization algorithms that are critical for current and future Airborne Electronic Attack (AEA) systems of the United States Navy (USN) and United States Marine Corps (USMC) to execute the evolving AEA mission. Through Modeling & Simulation (M&S), laboratory testing, and field testing, JATO optimizes parameters for existing EA systems (such as AN/ALQ-99 Tactical Jamming System (TJS) and the AN/ALQ-231(V) Intrepid Tiger II Family of Systems) to best counter existing threats, and applies that knowledge to define the requirements for follow-on AEA systems such as the Next Generation Jammer Mid-Band (NGJ-MB) and Next Generation Jammer Low Band (NGJ-LB) programs. As commercial and military Radio Frequency (RF) threats evolve and proliferate, the JATO organization provides updated tactics, techniques, and procedures to maximize the potency of USN and USMC AEA in meeting the Combatant Command (COCOM) Commanders' EW priorities, to include highly contested environments, Force Protection, Information Operations, and enhanced communications jamming. (Classified discussion available upon request).

JATO's Advanced Techniques Group (ATG) focuses specifically on electronic countermeasures to advanced threat weapon systems and Command, Control, and Communications (C3) networks that are challenging existing EA approaches, and how to best apply advances in geolocation and unknown threat characterization to EA responses. Additional efforts include risk reduction activities to evaluate and minimize EA interference with US weapons systems, and research/technology studies in support of upgrades to existing AEA systems such as the AN/ALQ-99 TJS.

The Electronic Warfare (EW) Advanced Capability Development project focuses on increasing the Department of the Navy's understanding and utilization of rapidly-evolving technologies that operate in the Electromagnetic spectrum. As commercial and military Radio Frequency (RF) threats evolve and proliferate, this project tracks the relevant technology, intelligence, and tactics to maximize the potency of USN and USMC AEA through the rapid insertion of emergent technologies into existing AEA weapon systems and aircraft platforms.

The Special Capability Pods (SCPs) project heavily leverages existing Air Force Research Laboratory (AFRL) projects and focuses on continued development, test, and evaluation of SCPs for utilization on USN aircraft platforms. Initial efforts to develop Navy pod variants were funded by the Air Force in FY18 as an OSD initiative. The SCPs will be specifically designed to address identified electromagnetic capability gaps and counter emerging electronic threats. As an iterative program, the highly modular interior design of the SCPs allows the pod to be integrated with current technology and upgraded electronics to provide the USN the rapidly adaptable solution to bridge capability gaps against rapidly and continuously evolving threats. Efforts in FY 2020 will result in the fielding of two initial technology demonstration prototypes. (Classified discussion available upon request).

AN/ALQ-99 TJS Band 9/10 Transmitters will remain in service after fielding of NGJ-MB and NGJ-LB and need to maintain effectiveness against present and future threats. The Band 9/10 extension is a modification to the ALQ-99 Band 9/10 transmitter to extend the frequency range and provide a contingency capability to address

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

emerging threats. (Classified discussion available upon request). Batwing Reflector Air to Ground variant is an organically produced alternate reflector for the AN/ ALQ-99 Band 9/10 Transmitter, increasing the radiating power for improved capability and effectiveness.

The Electromagnetic Maneuver Warfare (EMW) Resource Allocation Management (RAM) project develops a software application to interface with the display in the cockpit of the EA-18G. The software application will provide the aircrew with smart decision aids in flight to enhance EW capability and survivability, optimized flight profiles, and jamming effectiveness in highly contested environments. EMW RAM efforts are being conducted as a collaborative project with Australia under the Airborne Multi-Platform Electronic Warfare Project Arrangement.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Jammer Techniques Optimization (JATO) | 16.174 | 16.505 | 18.139 | 0.000 | 18.139 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The JATO organization will continue engineering development and test support of existing and emerging systems such as the EA-18G, and AN/ALQ-249 (NGJ-MB) to address potential RF and Cyber/EW effects on current and evolving radar/communications threats. JATO will continue to generate tactics, techniques, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, USQ-113, ALQ-218, ALQ-227, AN/ALQ-231(V), and Unmanned Aerial Systems (UAS) payloads. JATO continues to meet COCOM Commanders' EW priorities including support for Overseas Contingency Operations and Force Protection. (Classified discussion available upon request). | | | | | |
| ***FY 2020 Base Plans:***<br>The JATO organization will continue engineering development and test support of existing and emerging systems such as the EA-18G, and AN/ALQ-249 (NGJ-MB) to address potential RF and Cyber/EW effects on current and evolving radar/communications threats. JATO will continue to generate tactics, techniques, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, ALQ-218, ALQ-227, AN/ALQ-231(V), and Unmanned Aerial Systems (UAS) payloads. JATO continues to meet COCOM Commanders' EW priorities including support for Overseas Contingency Operations and Force Protection. (Classified discussion available upon request). | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding from FY 2019 to FY 2020 is required to support additional testing requirements for developmental EW systems, and to provide increased flight and ground testing against adversary systems. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Additionally, funds will provide for increased efforts of the Advanced Techniques Group (ATG) to address Cyber/ EW threats. | | | | | |
| ***Title:*** Electronic Warfare (EW) Advanced Development | 0.000 | 0.535 | 9.443 | 0.000 | 9.443 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>This project focuses on increasing the Department of the Navy's understanding and utilization of rapidly-evolving technologies to control the Electromagnetic spectrum. Efforts in FY 2019 include the investigation of rapid technology insertions into systems including, but not limited to, the AN/ALQ-99, AN/ALQ-231(V), AN/ALQ-249 (NGJ-MB), and Unmanned Aerial Systems (UAS) payloads to address existing capability gaps on COCOM Commanders' Integrated Priority Lists. Technology integration analysis to mitigate interoperability issues and ensure maximum lethality is also addressed. (Classified discussion available upon request).<br>***FY 2020 Base Plans:***<br>Efforts in FY20 include initial hardware and software prototyping, engineering, and multi-system effects characterization for capabilities into systems including, but not limited to, the AN/ALQ-99, AN/ALQ-231, AN/ ALQ-249, NGJ-LB, Special Capability Pod (SCP), and other manned and unmanned aircraft payloads to address existing capability gaps on COCOM Integrated Priority Lists. (Classified discussion available upon request).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>This project was previously funded under the JAMMER TECHNIQUES OPTIMIZATION (JATO) project and is now being separated to provide increased clarity. Increase from FY2019 to FY2020 is required to perform hardware and software prototyping, engineering and integration of advanced hardware and software into candidate systems along with initial characterization of cross system electronic effects. | | | | | |
| ***Title:*** Special Capability Pod (SCP) | 0.000 | 0.000 | 16.600 | 0.000 | 16.600 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The Special Capability Pods (SCPs) project leverages other ongoing Navy and Joint Service investments and focuses on continued development, test and evaluation of rapidly repurposable pods for highly flexible Airborne Electronic Attack capability, with Navy pod variants initially funded by Joint Service partners in FY18. As an iterative program, the highly modular interior design of the SCPs allows the pod to be integrated with updated technology and capability to provide the USN a rapidly adaptable solution to address capability gaps against targets such as, but not limited to, highly specialized and/or rapidly evolving threats. Efforts in FY20 will result in the delivery of initial technology demonstration prototypes. (Classified discussion available upon request).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The SCP project, leveraging previous and ongoing Navy and Joint Service investment, was previously included in the Electronic Warfare (EW) Advanced Development project. This tasking is now being separated in order to provide increased clarity. Increase from FY19 to FY20 is required to begin procuring hardware, software, and related aircraft integration and engineering efforts to support delivery of initial technology demonstration prototypes. | | | | | |
| ***Title:*** Electromagnetic Manuever Warfare (EMW) Resource Allocation Manager (RAM)<br>***Articles:***<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>The Department of Navy is developing dynamic Electromagnetic Maneuver Warfare (EMW) Resource Allocation Management (RAM) applications to increase operators effectiveness in the Electromagnetic Spectrum (ES). FY 2020 efforts includes development of defined Electronic Warfare (EW) architecture framework. (Classified discussion available upon request).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | 0.000<br>- | 0.000<br>- | 0.125<br>- | 0.000<br>- | 0.125<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The EMW RAM project was previously included in the EW Advanced Development project. This tasking is now being separated in order to provide increased clarity and transparency. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 16.174 | 17.040 | 44.307 | 0.000 | 44.307 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0513: *AEA Systems* | 49.729 | 40.277 | 44.470 | - | 44.470 | 56.307 | 58.592 | 57.933 | 59.417 | 47.775 | 745.030 |

**Remarks**

**D. Acquisition Strategy**

The JATO organization, comprised of a partnership between the Government and several University Aligned Research Centers, continues to research EW tactics and techniques. The JATO prime delivery order, a cost plus fixed fee contract that covers the period of FY 2017 through FY 2021, was awarded to Johns Hopkins University in 4th Qtr. FY 2017.

The Electronic Warfare (EW) Advanced Capability Development project will investigate developmental and existing technologies from commercial and governmental sources for integration into current and emerging USN and USMC EW weapon systems and aircraft. These technologies, once demonstrated to have sufficient maturity, will transition into the applicable acquisition programs. Additionally, the project will pursue technology development and demonstration through rapid acquisition or Speed to Fleet initiatives to the greatest extent possible.

The Special Capability Pods (SCPs) project heavily leverages existing Air Force Research Laboratory (AFRL) projects and focuses on continued development, test, and evaluation of SCPs for utilization on USN aircraft platforms. Initial efforts to develop Navy pod variants were funded by the Air Force in FY18 as an OSD initiative. The SCPs will be specifically designed to address identified electromagnetic capability gaps and counter emerging electronic threats. As an iterative program, the highly modular interior design of the SCPs allows the pod to be integrated with current technology and upgraded electronics to provide the USN the rapidly adaptable solution to bridge capability gaps against rapidly and continuously evolving threats. Efforts in FY 2020 will result in the fielding of two initial technology demonstration prototypes. (Classified discussion available upon request).

The Batwing Reflector Air to Air variant for the AN/ALQ-99 Band 9/10 Transmitter began procurement in FY 2017 as part of a Speed to Fleet initiative. Development of the Batwing Reflector Air to Ground variant for the AN/ALQ-99 Band 9/10 Transmitter flown on the EA-18G platform will commence in 2Qtr. FY 2020 and will capitalize on investments already made on the Batwing Air to Air variant.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

**E. Performance Metrics**

JATO development counters enemy radar systems and communication systems to provide techniques to protect allied forces. Development of the SCP and EMW RAM commence in FY 2020. AN/ALQ-99 TJS Band 9/10 Transmitter extension and Batwing Reflector Air to Ground variant are planned to start in FY 2021.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>0556 / *EW Counter Response* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HDW Development - SCP | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 10.343 | Nov 2019 | - | | 10.343 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | Naval Research Lab : Maryland | 13.925 | 1.885 | Nov 2017 | 1.893 | Nov 2018 | 2.085 | Nov 2019 | - | | 2.085 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 24.741 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCWD : Point Mugu, CA | 90.109 | 2.952 | Nov 2017 | 3.394 | Nov 2018 | 7.022 | Nov 2019 | - | | 7.022 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 2.400 | Nov 2019 | - | | 2.400 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC Det : Crane, IN | 11.276 | 0.325 | Nov 2017 | 0.452 | Nov 2018 | 1.433 | Nov 2019 | - | | 1.433 | Continuing | Continuing | Continuing |
| Systems Engineering | Various | Various : Various | 14.893 | 0.000 | | 0.000 | | 1.832 | Nov 2019 | - | | 1.832 | Continuing | Continuing | Continuing |
| Prior Year Development cost no longer Funded in the FYDP | Various | Various : Various | 263.147 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 263.147 | - |
| | | **Subtotal** | 418.091 | 5.162 | | 5.739 | | 25.115 | | - | | 25.115 | Continuing | Continuing | N/A |

**Remarks**

Funding increases from FY 2019 to FY 2020 due to the development of Special Capability Pods (SCP) beginning in FY 2020.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support - Jammer Techniques Optimization (JATO) | SS/CPFF | Johns Hopkins Unv : Maryland | 44.829 | 4.749 | Nov 2017 | 4.760 | Dec 2018 | 5.055 | Dec 2019 | - | | 5.055 | Continuing | Continuing | Continuing |
| Development Support - EW Advanced Development | SS/CPFF | Johns Hopkins Unv : Maryland | 0.000 | 0.000 | | 0.235 | Dec 2018 | 3.001 | Dec 2019 | - | | 3.001 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>0556 / *EW Counter Response* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support - Jammer Techniques Optimization (JATO) | SS/CPFF | GTRI : Atlanta, GA | 0.000 | 0.987 | Jul 2018 | 0.992 | Dec 2018 | 1.012 | Dec 2019 | - | | 1.012 | Continuing | Continuing | Continuing |
| Development Support - EW Advanced Development | SS/CPFF | GTRI : Atlanta, GA | 0.000 | 0.000 | | 0.000 | | 2.500 | Dec 2019 | - | | 2.500 | Continuing | Continuing | Continuing |
| Eng & Tech Srvc (Non FFRDC) | Various | Various : Various | 18.852 | 1.433 | Nov 2017 | 1.446 | Dec 2018 | 1.975 | Dec 2019 | - | | 1.975 | Continuing | Continuing | Continuing |
| Prior year Support costs no longer funded in the FYDP | Various | Various : Various | 2.256 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.256 | - |
| | | **Subtotal** | 65.937 | 7.169 | | 7.433 | | 13.543 | | - | | 13.543 | Continuing | Continuing | N/A |

**Remarks**

Funding increases from FY 2019 to FY 2020 due to development support associated with the Special Capability Pods (SCP)effort beginning in FY 2020, and increased EW Advanced Development support.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JATO Flight Test | WR | NAWCWD : Point Mugu, CA | 0.961 | 1.681 | Nov 2017 | 1.695 | Nov 2018 | 2.229 | Nov 2019 | - | | 2.229 | Continuing | Continuing | Continuing |
| JATO Ground/Lab Test | WR | NAWCWD : Point Mugu, CA | 2.380 | 1.678 | Nov 2017 | 1.682 | Nov 2018 | 1.715 | Nov 2019 | - | | 1.715 | Continuing | Continuing | Continuing |
| JATO Flight Test | WR | Various : Various | 0.000 | 0.354 | Nov 2017 | 0.361 | Nov 2018 | 0.368 | Nov 2019 | - | | 0.368 | Continuing | Continuing | Continuing |
| SCP Test | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 1.157 | Nov 2019 | - | | 1.157 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.341 | 3.713 | | 3.738 | | 5.469 | | - | | 5.469 | Continuing | Continuing | N/A |

**Remarks**

Funding increases from FY 2019 to FY 2020 due to testing requirements associated with SCP efforts beginning in FY 2020.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | Various : Various | 1.318 | 0.030 | Oct 2017 | 0.030 | Oct 2018 | 0.030 | Oct 2019 | - | | 0.030 | Continuing | Continuing | Continuing |
| Travel | WR | Various : Various | 0.240 | 0.100 | Oct 2017 | 0.100 | Oct 2018 | 0.150 | Oct 2019 | - | | 0.150 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.558 | 0.130 | | 0.130 | | 0.180 | | - | | 0.180 | Continuing | Continuing | N/A |

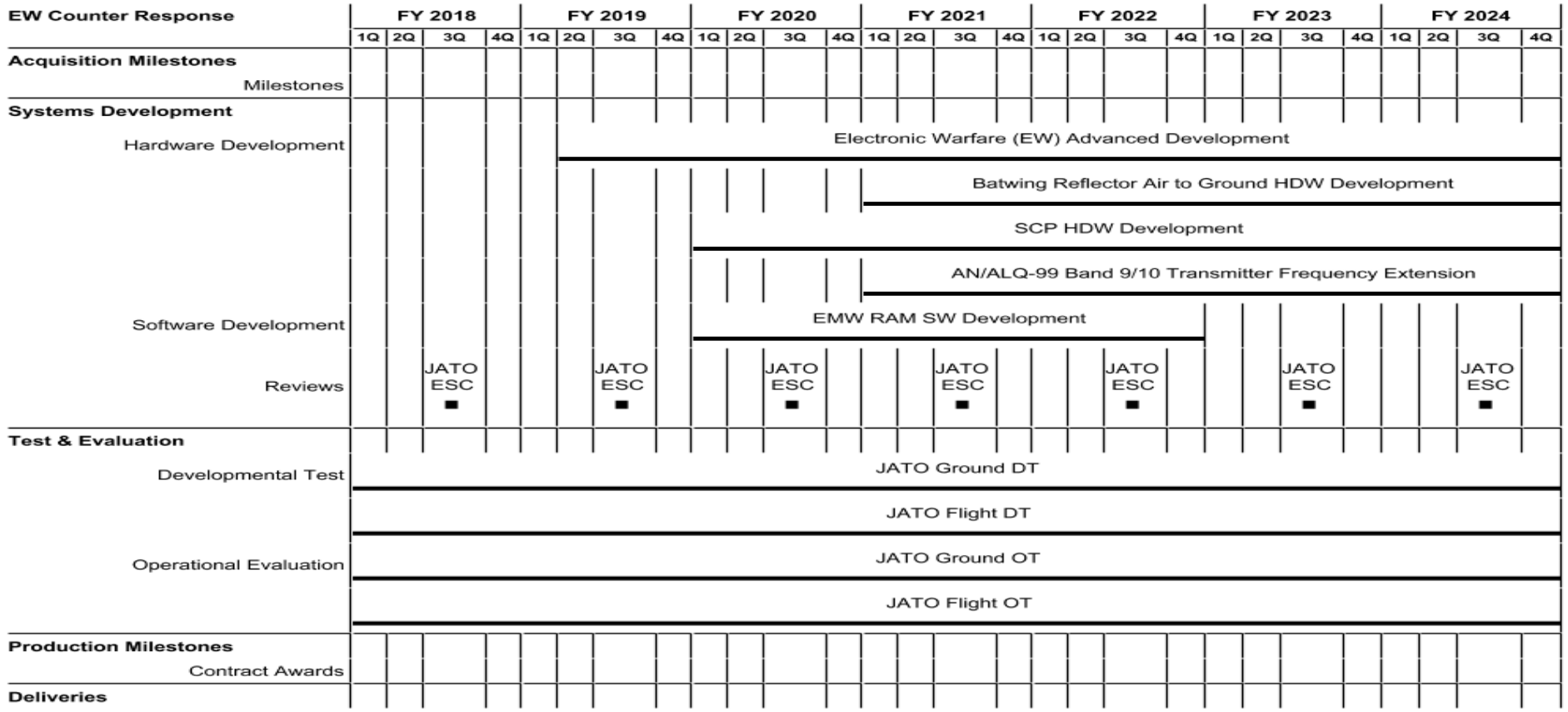
**Remarks**

Funding increases from FY 2019 to FY 2020 for additional headquarters travel funding required to support the SCP effort.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 488.927 | 16.174 | | 17.040 | | 44.307 | | - | | 44.307 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |




*2020PB - 0604270N - 0556*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>0556 / *EW Counter Response* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***EW Counter Response*** | | | | |
| Systems Development: Hardware Development: Electronic Warfare (EW) Advanced Development | 2 | 2019 | 4 | 2024 |
| Systems Development: Hardware Development: Batwing Reflector Air to Ground Hardware Development | 1 | 2021 | 4 | 2024 |
| Systems Development: Hardware Development: Special Capability Pod (SCP) Hardware Development | 1 | 2020 | 4 | 2024 |
| Systems Development: Hardware Development: AN/ALQ-99 Band 9/10 Transmitter Frequency Extension | 1 | 2021 | 4 | 2024 |
| Systems Development: Software Development: Electromagnetic Manuever Warfare (EMW) Resource Allocation Manager (RAM) Development | 1 | 2020 | 4 | 2022 |
| Systems Development: Reviews: JATO Executive Steering Committee 2018 | 3 | 2018 | 3 | 2018 |
| Systems Development: Reviews: JATO Executive Steering Committee 2019 | 3 | 2019 | 3 | 2019 |
| Systems Development: Reviews: JATO Executive Steering Committee 2020 | 3 | 2020 | 3 | 2020 |
| Systems Development: Reviews: JATO Executive Steering Committee 2021 | 3 | 2021 | 3 | 2021 |
| Systems Development: Reviews: JATO Executive Steering Committee 2022 | 3 | 2022 | 3 | 2022 |
| Systems Development: Reviews: JATO Executive Steering Committee 2023 | 3 | 2023 | 3 | 2023 |
| Systems Development: Reviews: JATO Executive Steering Committee 2024 | 3 | 2024 | 3 | 2024 |
| Test & Evaluation: Developmental Test: JATO Ground Developmental Test | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Developmental Test: JATO Flight Developmental Test | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Operational Evaluation: JATO Ground Operational Test | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Operational Evaluation: JATO Flight Operational Test | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>1742 / *EW Technical Development and T&E* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1742: *EW Technical Development and T&E* | 4.047 | 1.064 | 1.833 | 1.764 | - | 1.764 | 1.614 | 1.650 | 1.684 | 1.718 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Electronic Warfare systems for the United States Navy (USN), United States Marine Corps (USMC), and United States Army tactical aircraft, USMC helicopters, surface combatants, data link vulnerability assessments, precision targeting, USN and USMC radio frequency jammers, and development and testing of electronic warfare devices for emerging threats and emergency contingencies. This element also includes development of Aircraft Survivability Equipment (ASE) and Electronic Warfare (EW) countermeasures solutions for the USN, USMC, and Coalition Aircraft to include studies and evaluations of current and future aircraft threats, modeling and simulation for improved countermeasure capabilities, and development and testing to address new and emerging threats. This program is funded under System Development and Demonstration because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision. (More details available at a higher classification upon request).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Electronic Warfare Technical Development and Test & Evaluation | 1.064 | 1.833 | 1.764 | 0.000 | 1.764 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Quick reaction prototyping of tactical information and electronic warfare systems. Addresses various Fleet requirements across multiple platforms (airborne, surface and subsurface), airborne and surface cryptologic operational requirements documents and the joint oversight council missions needs statement to research, assess, and develop information warfare and electronic warfare systems and capabilities. These systems/capabilities provide information dominance to friendly forces during conflict, which is necessary for successful mission accomplishment. | | | | | |
| ***FY 2019 Plans:***<br>Perform engineering development and test support of existing and emerging systems such as the EA-6B, EA-18G, and Next Generation Jammer to address potential Radio Frequency (RF) and Cyber/Electronic Warfare (EW) effects on current and evolving radar/communications threats. Generate techniques, tactics, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, USQ-113, ALQ-218, ALQ-227, AN/ALQ-231, ALE-43; and assist in requirements definitions of emerging Airborne | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>1742 / *EW Technical Development and T&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Electronic Attack (AEA) systems. Continue to lead efforts in support of Overseas Operations and Force Protection issues. (Classified discussion available upon request).<br>***FY 2020 Base Plans:***<br>Continue Engineering development and test support efforts of existing and emerging systems such as the EA-6B, EA-18G, and Next Generation Jammer to address potential Radio Frequency (RF) and Cyber/EW effects on current and evolving radar/communications threats. Generate techniques, tactics, and procedures to optimize the capabilities of systems such as, but not limited to, the AN/ALQ-99, USQ-113, ALQ-218, ALQ-227, AN/ALQ-231, ALE-43; and assist in requirements definitions of emerging AEA systems. Continue to lead efforts in support of Overseas Operations and Force Protection issues. (Classified discussion available upon request).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 to FY20 decrease due to procurement and process improvement efficiencies. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.064 | 1.833 | 1.764 | 0.000 | 1.764 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Development of classified prototypes and special capabilities. The Navy is granted streamlined acquisition authority for the development of classified prototypes and special capabilities under the Deputy Assistant Secretary of the Navy (DASN) (C4I).

**E. Performance Metrics**

Measures include quality and impact of new ideas and approaches; the success of the technology application in satisfying Combatant Commanders and Fleet requirements; and successful cost effective transition of capabilities to operational systems. The goal of these investments is to provide non-kinetic options to Commanders to influence adversaries and prevent escalation of crises. Qualitative measures are used initially then through development of modeling and simulation scenarios and capabilities, transition to quantitative metrics. Success heavily depends upon insight and feedback obtained through various intelligence community efforts and results.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>1742 / *EW Technical Development and T&E* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development | C/FP | Classified : classified | 3.338 | 0.816 | Oct 2017 | 1.524 | Oct 2018 | 1.032 | Oct 2019 | - | | 1.032 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.338 | 0.816 | | 1.524 | | 1.032 | | - | | 1.032 | Continuing | Continuing | N/A |

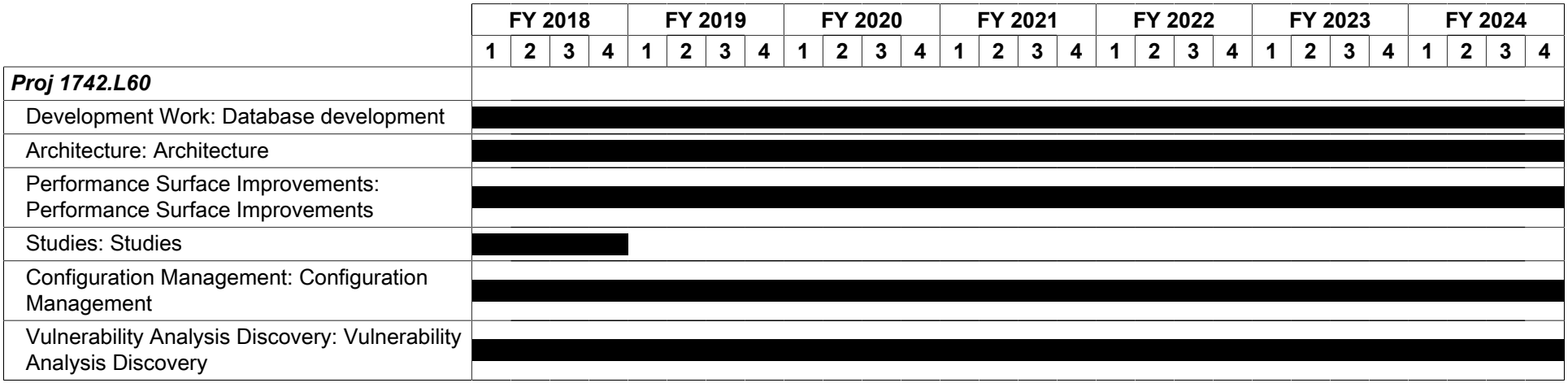
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mod & Sim | C/CPFF | Classified : Classified | 0.709 | 0.248 | Oct 2017 | 0.309 | Oct 2018 | 0.732 | Oct 2019 | - | | 0.732 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.709 | 0.248 | | 0.309 | | 0.732 | | - | | 0.732 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 4.047 | 1.064 | | 1.833 | | 1.764 | | - | | 1.764 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>1742 / *EW Technical Development and T&E* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>1742 / *EW Technical Development and T&E* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1742.L60*** | | | | |
| Development Work: Database development | 1 | 2018 | 4 | 2024 |
| Architecture: Architecture | 1 | 2018 | 4 | 2024 |
| Performance Surface Improvements: Performance Surface Improvements | 1 | 2018 | 4 | 2024 |
| Studies: Studies | 1 | 2018 | 4 | 2018 |
| Configuration Management: Configuration Management | 1 | 2018 | 4 | 2024 |
| Vulnerability Analysis Discovery: Vulnerability Analysis Discovery | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>2175 / *Tactical Air Electronic Warfare* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2175: *Tactical Air Electronic Warfare* | 498.786 | 2.091 | 45.074 | 48.624 | - | 48.624 | 71.093 | 71.179 | 52.270 | 53.311 | 0.000 | 842.428 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 418

**A. Mission Description and Budget Item Justification**

Integrated Defensive Electronic Countermeasures (IDECM) Block 3 (IB-3/ALE-55) introduced the new Fiber Optic Towed Decoy (FOTD), ALE-55, capability to the IDECM Block 2 Electronic Warfare (EW) suite as a replacement for the ALE-50 Advanced Airborne Electronic Decoy (AAED). The FOTD, when integrated with the rest of the F/A-18E/F EW suite (i.e., ALQ-214, ALR-67(V)3, ALE-47 and ALE-50), the associated cockpit controls, displays and other avionics significantly improves the survivability of the host aircraft in a radio frequency threat environment. IB-3 MS III (Full-Rate Production Decision) was approved in the 4th Qtr. FY 2011. IB-3 Initial Operational Capability (IOC) was achieved 4th Qtr. FY 2011.

IDECM Block 4 (IB-4) is an Engineering Change Proposal (ECP) to the ALQ-214 to render it suitable for operation on F/A-18C/D aircraft (replacing the ALQ-126B and significantly improving F/A-18C/D survivability) while retaining all IDECM suite functionality when installed on F/A-18E/F aircraft. The IB-4 acquisition and contract strategy includes development of the Common On-Board Jammer for the F/A-18 C/D/E/F aircraft through sole source contract awards for modifications to the ALQ-214. IB-4, ALQ-214 ECP efforts include hardware and software design, development and test, delivery of 17 engineering development models, integration and testing on the host aircraft. The F/A-18 EW suite includes the ALR-67 Radar Warning Receiver (RWR), the ALE-47 Countermeasures Dispensing Set (CMDS), the mission computer and other avionics. In addition to performing the RWR function, the ALR-67 is the EW bus controller. The EW bus is the primary interface between the EW systems (Jammer, RWR, and CMDS). The mission computer is the avionics bus controller, the interface between the EW suite and other avionics. IB-4 production Cut-In occurred 2nd Qtr FY 2012, Initial Operational Capability (IOC) achieved May 2015.

ALQ-214 software improvement will provide the ALQ-214 with digital radio frequency memory deny-delay, technique capability significantly improving F/A-18C/D/E/F survivability. Acquisition and contract strategy includes development, integration and test of the ALQ-214 software improvements through sole-source contract award. Modifications to other F/A-18E/F Block II and Block III aircraft avionics may be required in order to develop and integrate this capability. These other avionics may include, but are not limited to, the ALR-67(V)2, ALR-67(V)3, ALE-47, ALE-50 AAED, ALE-55 FOTD, mission computer and fire control radar.

F/A-18 E/F ALQ-214 Adaptive Radar Countermeasures (ARC) will provide the ALQ-214 with improved RF threat detection algorithms and jamming against modern threat radars. Modifications to other F/A-18E/F Block II and Block III aircraft avionics may be required in order to develop and integrate this capability. These other avionics may include, but are not limited to, the ALR-67(V)2, ALR-67(V)3, ALE-47, ALE-50 AAED, ALE-55 FOTD, mission computer and fire control radar.

The Dual Band Decoy (DBD) will provide expanded Radio Frequency (RF) capability against current and emerging modern RF threat radars, significantly improving the survivability of the F/A-18 E/F. DBD will replace the current ALE-55 FOTD beginning with fielding of an Early Operational Capability in FY 2023. Modifications to other F/

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |

A-18E/F Block II and Block III aircraft avionics may be required in order to develop and integrate this capability. These other avionics may include, but are not limited to, the ALR-67(V)2, ALR-67(V)3, ALE-47, ALE-50 AAED, ALE-55 FOTD, mission computer and fire control radar.

This Project also includes/enables integrated Aircraft Survivability Equipment (iASE) which improves situational awareness for own-ship, wingman, and distributed command and control.

Project Unit 2175 Tactical Air Electronic Warfare Cost to Complete should read $4.331 Million. Total Cost should read $842,760 Million.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Tactical Air EW | 2.091 | 45.074 | 48.624 | 0.000 | 48.624 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>IDECM ARC Requirements Definition will begin in FY 2019.<br>Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019. | | | | | |
| ***FY 2020 Base Plans:***<br>IDECM ARC Development, Integration and Test will continue in FY 2020 and continue into FY 2024.<br>Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase of $3.550M from FY19 to FY20 is for Flight testing on Legacy Hornet A/C. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.091 | 45.074 | 48.624 | 0.000 | 48.624 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0576 004-12: *Common On-Board Jammer* | 44.826 | 66.854 | 44.672 | - | 44.672 | 43.347 | 49.750 | 50.568 | 52.261 | 28.930 | 808.547 |
| • PANMC/0182: *Airborne Expendable CM* | 23.534 | 23.712 | 18.110 | - | 18.110 | 18.527 | 25.847 | 46.137 | 47.054 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Airborne Expendable Countermeasures procurement above is for both ALE-55 and the DBD. It is anticipated that a transition from ALE-55 to an EOC variant of DBD will occur in FY 2022.

**D. Acquisition Strategy**

IB-4 Engineering Change Proposal (ECP) and Software Improvement (SWIP) development contracts were awarded sole-source to Harris in 2009 and 2012 respectively. Harris is the original developer/manufacturer and current sustainer of the ALQ-214. Annual IB-4 production awards are planned through 2025.

ARC development contract is planned as a sole source to Leidos beginning in 2019 continuing through 2023. DBD development is planned as an evolutionary development approach with competitive prototyping phase starting in FY 2019 through FY 2021, followed by a competitive EMD phase starting in FY 2021 continuing into FY 2024.

**E. Performance Metrics**

IDECM Block 4: ALQ-214 FRP 14-16 contract awarded 4th Qtr. FY 2017. FRP-15 option contract awarded 2nd Qtr. FY 2018. FRP 16 contract award is planned for 2nd Qtr. FY 2019. ALQ-214 FRP 14-16 is a Sole Source Firm Fixed Price (SS/FFP) contract with a base plus 2 options to Harris.
ALQ-214 Software Improvement: Successfully achieve Fleet Release in 4th Qtr. FY 2018.

ARC: Successfully award ARC development contract to Leidos in 1st Qtr. FY 2019. Development contract will continue into FY 2024.

DBD: Successfully award a DBD prototype development contract in FY 2019. Contract will continue through FY 2021. Contractor is TBD.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>2175 / *Tactical Air Electronic Warfare* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Eng - IDECM | SS/CPFF | Various : Various | 64.169 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 64.169 | 64.169 |
| Adaptive Radar Countermeasures (ARC) Development | SS/CPFF | Leidos : Arlington, VA | 0.000 | 0.000 | | 13.092 | Jan 2019 | 9.402 | Dec 2019 | - | | 9.402 | 76.614 | 99.108 | 96.383 |
| Dual Band Decoy Development | TBD | TBD : TBD | 0.000 | 0.000 | | 27.778 | May 2019 | 28.651 | May 2020 | - | | 28.651 | 95.482 | 151.911 | 153.528 |
| Prior Year Prod Dev costs no longer funded in FYDP | Various | Various : Various | 243.543 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 243.543 | - |
| | | **Subtotal** | 307.712 | 0.000 | | 40.870 | | 38.053 | | - | | 38.053 | 172.096 | 558.731 | N/A |

**Remarks**

IDECM ARC Requirements Definition will begin in FY 2019. Development, Integration and Test will begin in FY 2020.
Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Log Supt- ARC | WR | NAWCAD : Pax River, MD | 0.000 | 0.000 | | 0.000 | | 0.057 | Nov 2019 | - | | 0.057 | 0.238 | 0.295 | - |
| Software Dev-ALQ - 214 SW Dev | SS/CPFF | Harris : Clifton, NJ | 27.875 | 1.781 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 29.656 | 29.656 |
| Engineering Support | WR | Various : Various | 2.318 | 0.095 | Nov 2017 | 0.249 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.662 | - |
| Studies and Analysis SW Dev | SS/CR | Johns Hopkins : Baltimore, MD | 1.573 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.573 | 1.573 |
| Engineering Support ARC | WR | Various : Various | 0.000 | 0.000 | | 1.416 | Nov 2018 | 1.611 | Nov 2019 | - | | 1.611 | 13.200 | 16.227 | - |
| Engineering Support Dual Band Decoy | WR | Various : Various | 0.000 | 0.000 | | 1.912 | Nov 2018 | 3.045 | Nov 2019 | - | | 3.045 | 14.150 | 19.107 | - |
| Prior Year Support costs no longer funded in FYDP | Various | Various : Various | 19.531 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.531 | - |
| Software Dev-ALQ - 214 SW Dev | C/CPFF | GTRI : Atlanta GA | 0.000 | 0.000 | | 0.222 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.222 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>2175 / *Tactical Air Electronic Warfare* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 51.297 | 1.876 | | 3.799 | | 4.713 | | - | | 4.713 | 27.588 | 89.273 | N/A |

**Remarks**

Software Dev - ALQ-214 SW Dev. Software Development challenges required additional funding to complete the effort.
IDECM ARC Requirements Definition will begin in FY 2019. Development, Integration and Test will begin in FY 2020.
Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dev Test & Eval Supt ALQ-214 SW Imp | WR | Various : Various | 0.420 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.420 | - |
| Integrated Test & Eval ALQ-214 SW Imp | WR | NAWCWD : China Lake, CA | 0.952 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.952 | - |
| Integrated Test & Eval ALQ-214 SW Imp C/D Aircraft | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 4.000 | Oct 2019 | - | | 4.000 | 0.000 | 4.000 | - |
| Dev Test & Eval Supt ALQ-214 SW Imp | WR | NAWCWD : China Lake, CA | 12.535 | 0.169 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.704 | - |
| Dev Test & Eval Supt ALQ-214 SW IMP | WR | NAWCWD : Point Mugu, CA | 2.210 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.210 | - |
| Oper Test & Eval IDECM | WR | NAWCWD : China Lake, CA | 2.737 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.737 | - |
| Eng Test & Eval IDECM | WR | Various : Various | 2.657 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.657 | - |
| Eng & Tech Srvcs (Non-FFRDC) | SS/CPFF | Various : Various | 2.453 | 0.000 | | 0.032 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.485 | 2.453 |
| Dev Test & Eval Supt ARC | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 1.303 | Nov 2019 | - | | 1.303 | 10.082 | 11.385 | - |
| Integrated Test & Eval ARC | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 2.459 | 2.459 | - |
| Oper Test & Eval ARC | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 12.000 | 12.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>2175 / *Tactical Air Electronic Warfare* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oper Test & Eval ARC (VX-9) | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 6.900 | 6.900 | - |
| Dev Test & Eval Supt Dual Band Decoy | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 5.711 | 5.711 | - |
| Integrated Test & Eval Dual Band Decoy | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 2.115 | 2.115 | - |
| Oper Test & Eval Dual Band Decoy | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 7.050 | 7.050 | - |
| Eng Test & Eval ARC | WR | Various : Various | 0.000 | 0.000 | | 0.321 | Nov 2018 | 0.502 | Nov 2019 | - | | 0.502 | 2.111 | 2.934 | - |
| Oper Test & Eval DBD (VX-9) | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 3.788 | 3.788 | - |
| Prior Year T&E costs no longer funded in FYDP | WR | Various : Various | 26.007 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 26.007 | - |
| | | **Subtotal** | 49.971 | 0.169 | | 0.353 | | 5.805 | | - | | 5.805 | 52.216 | 108.514 | N/A |

**Remarks**

IDECM ARC Requirements Definition will begin in FY 2019. Development, Integration and Test will begin in FY 2020.
Dual Band Decoy (DBD) Competitive Prototyping, Development, Integration and Test will begin in FY 2019.
ALQ-214 Integrated Test & Evaluation on the F/A-18 C/D aircraft will occur in FY 2020.

**Management Services ($ in Millions)**

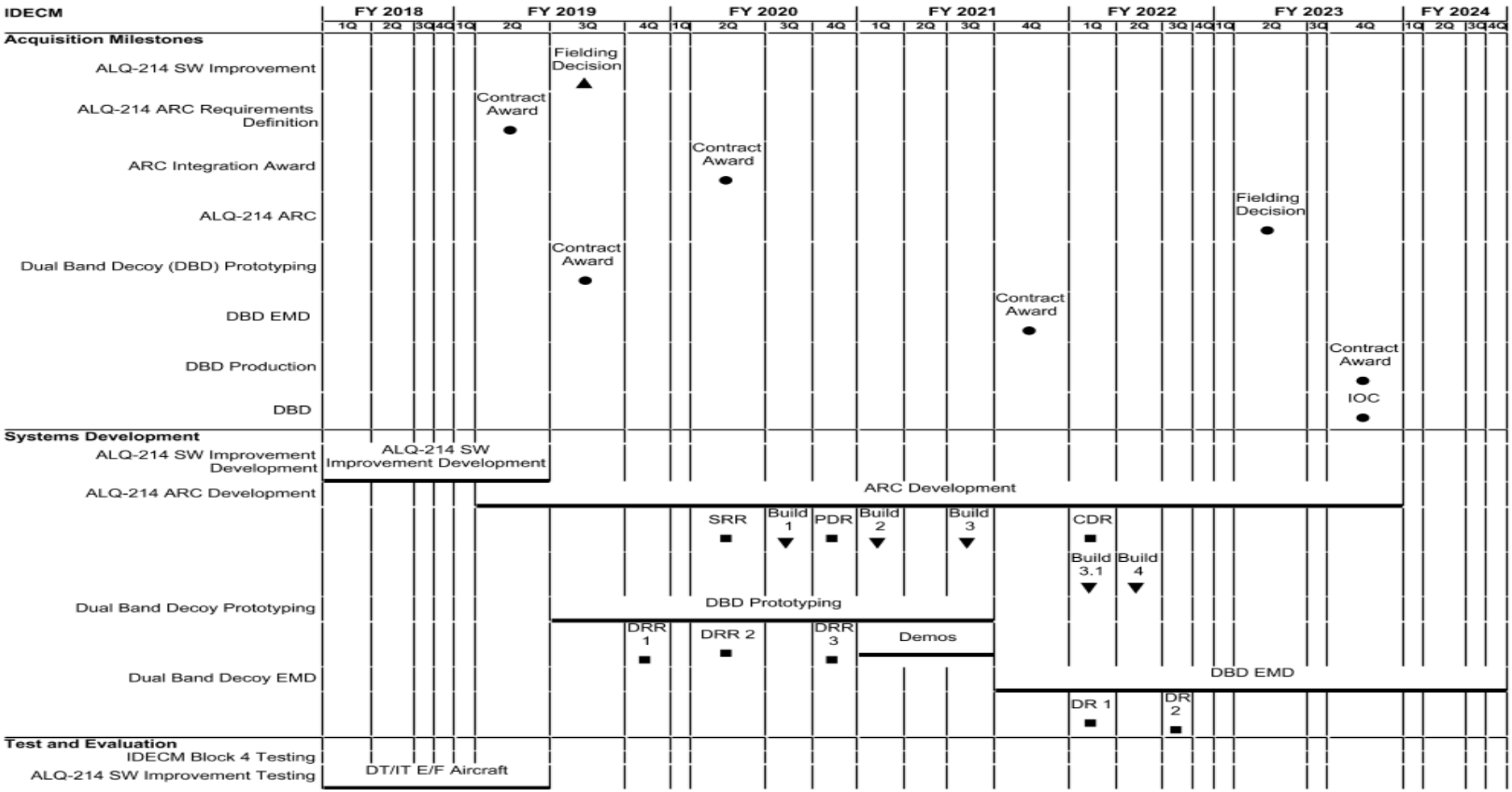
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | NAWCAD : Pax River, MD | 0.871 | 0.046 | Oct 2017 | 0.052 | Oct 2018 | 0.053 | Oct 2019 | - | | 0.053 | 0.285 | 1.307 | - |
| Prior Year Mgmt costs no longer funded in FYDP | Various | Various : Various | 88.935 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 88.935 | - |
| | | **Subtotal** | 89.806 | 0.046 | | 0.052 | | 0.053 | | - | | 0.053 | 0.285 | 90.242 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>2175 / *Tactical Air Electronic Warfare* | |

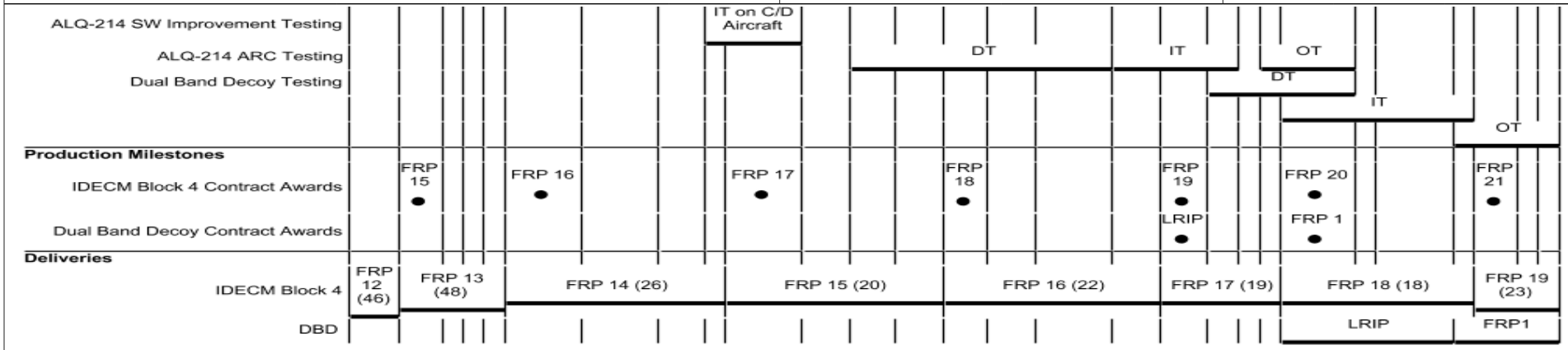
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 498.786 | 2.091 | | 45.074 | | 48.624 | | - | | 48.624 | 252.185 | 846.760 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |




*2020PB - 0604270N - 2175 IDECM Block 4 is an ECP to Block 2*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***IDECM*** | | | | |
| Acquisition Milestones: ALQ-214 SW Improvement: ALQ-214 SW Improvement Fielding Decision | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: ALQ-214 ARC Requirements Definition: ALQ-214 ARC Requirements Definition | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: ARC Integration Award: ARC Integration Award | 2 | 2020 | 2 | 2020 |
| Acquisition Milestones: ALQ-214 ARC: ALQ-214 ARC | 2 | 2023 | 2 | 2023 |
| Acquisition Milestones: Dual Band Decoy (DBD) Prototyping: Contrat Award | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: DBD EMD: Contract Award | 4 | 2021 | 4 | 2021 |
| Acquisition Milestones: DBD Production: Contract Award | 4 | 2023 | 4 | 2023 |
| Acquisition Milestones: DBD: IOC | 4 | 2023 | 4 | 2023 |
| Systems Development: ALQ-214 SW Improvement Development: ALQ-214 SW Improvement Development | 1 | 2018 | 2 | 2019 |
| Systems Development: ALQ-214 ARC Development: ARC Development | 2 | 2019 | 4 | 2023 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Systems Requirements Review | 2 | 2020 | 2 | 2020 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Preliminary Design Review | 4 | 2020 | 4 | 2020 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Critical Design Review | 1 | 2022 | 1 | 2022 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 1 | 3 | 2020 | 3 | 2020 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 2 | 1 | 2021 | 1 | 2021 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 3 | 3 | 2021 | 3 | 2021 |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 3.1 | 1 | 2022 | 1 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: ALQ-214 ARC Development: ALQ-214 ARC Build 4 | 2 | 2022 | 2 | 2022 |
| Systems Development: Dual Band Decoy Prototyping: DBD Prototyping | 3 | 2019 | 3 | 2021 |
| Systems Development: Dual Band Decoy Prototyping: Design Readyness Review 1 | 4 | 2019 | 4 | 2019 |
| Systems Development: Dual Band Decoy Prototyping: Design Readyness Review 2 | 2 | 2020 | 2 | 2020 |
| Systems Development: Dual Band Decoy Prototyping: Design Readyness Review 3 | 4 | 2020 | 4 | 2020 |
| Systems Development: Dual Band Decoy Prototyping: Prototype Demonstrations | 1 | 2021 | 3 | 2021 |
| Systems Development: Dual Band Decoy EMD: DBD EMD | 4 | 2021 | 4 | 2024 |
| Systems Development: Dual Band Decoy EMD: Design Review 1 | 1 | 2022 | 1 | 2022 |
| Systems Development: Dual Band Decoy EMD: Design Review 2 | 3 | 2022 | 3 | 2022 |
| Test and Evaluation: ALQ-214 SW Improvement Testing: ALQ-214 SW Improvement Development Testing (DT)/Integrated Testing (IT) E/F | 1 | 2018 | 2 | 2019 |
| Test and Evaluation: ALQ-214 SW Improvement Testing: ALQ-214 SW Improvement Integrated Testing (IT) on C/D Aircraft | 1 | 2020 | 2 | 2020 |
| Test and Evaluation: ALQ-214 ARC Testing: ALQ-214 ARC Developmental Testing | 4 | 2020 | 4 | 2021 |
| Test and Evaluation: ALQ-214 ARC Testing: ALQ-214 ARC Integrated Testing | 1 | 2022 | 3 | 2022 |
| Test and Evaluation: ALQ-214 ARC Testing: ALQ-214 ARC Operational Testing | 1 | 2023 | 2 | 2023 |
| Test and Evaluation: Dual Band Decoy Testing: DBD Developmental Testing | 3 | 2022 | 2 | 2023 |
| Test and Evaluation: Dual Band Decoy Testing: DBD Integrated Testing | 2 | 2023 | 1 | 2024 |
| Test and Evaluation: Dual Band Decoy Testing: DBD Operational Testing | 1 | 2024 | 4 | 2024 |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 15 | 2 | 2018 | 2 | 2018 |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 16 | 2 | 2019 | 2 | 2019 |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 17 | 2 | 2020 | 2 | 2020 |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 18 | 2 | 2021 | 2 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>2175 / *Tactical Air Electronic Warfare* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 19 | 2 | 2022 | 2 | 2022 |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 20 | 2 | 2023 | 2 | 2023 |
| Production Milestones: IDECM Block 4 Contract Awards: IDECM Block 4 Full-Rate Production (FRP) 21 | 2 | 2024 | 2 | 2024 |
| Production Milestones: Dual Band Decoy Contract Awards: DBD Low Rate Initial Production | 2 | 2022 | 2 | 2022 |
| Production Milestones: Dual Band Decoy Contract Awards: DBD Full Rate Production | 2 | 2023 | 2 | 2023 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 12 Deliveries (46) | 1 | 2018 | 1 | 2018 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 13 Deliveries (48) | 2 | 2018 | 1 | 2019 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 14 Deliveries (26) | 2 | 2019 | 1 | 2020 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 15 Deliveries (20) | 2 | 2020 | 1 | 2021 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 16 Deliveries (22) | 2 | 2021 | 1 | 2022 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 17 Deliveries (19) | 2 | 2022 | 1 | 2023 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 18 Deliveries (18) | 2 | 2023 | 1 | 2024 |
| Deliveries: IDECM Block 4: IDECM Block 4 FRP 19 Deliveries (23) | 2 | 2024 | 4 | 2024 |
| Deliveries: DBD: DBD LRIP Deliveries | 2 | 2023 | 4 | 2023 |
| Deliveries: DBD: DBD FRP1 Deliveries | 1 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3308 / *Technology Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3308: *Technology Development* | 0.000 | 2.276 | 6.108 | 6.238 | - | 6.238 | 8.444 | 8.614 | 8.776 | 8.950 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

PE 0604279N consolidated to PE 0604270N beginning in FY 2017.

**A. Mission Description and Budget Item Justification**

Project Unit 3308 / Technology Development funds efforts that focus on the quick reaction prototyping and fielding of Tactical Electronic Warfare (EW)/countermeasures solutions for increased resilience and survivability by improving the active electronic defense of tactical aircraft. This self-protection provides friendly forces the ability to deploy, survive, operate, maneuver, and regenerate in all domains while under attack as well as strike diverse targets inside adversary air and missile defense networks to destroy mobile power-projection platforms. This Project also includes/enables integrated Aircraft Survivability Equipment (iASE) which improves situational awareness for own-ship, wingman, and distributed command and control. Significant investments have been made in the modular hardware and reprogrammable software resident in ASE capability which is fielded today. Technology Development makes specific investments towards countermeasure/jammer/receiver algorithm development, threat data file and model updates as modern threats continue to evolve. These updated data files and algorithms can be deployed within hours of release by squadron maintenance personnel to aircraft while still on the ramp or flight deck. This program directly addresses the operational requirement of Strike survivability platforms for optimization of EW/countermeasure solutions across the Department of Navy.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Technology Development | 2.276 | 6.108 | 6.238 | 0.000 | 6.238 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Perform EW vulnerability studies/analysis, product development and test conducted for the ALQ-214 system on the F/A-18 C/D and E/F for both USMC and Navy aircraft. Develop, model and test advanced electronic countermeasure algorithms for USMC and Navy aircraft to defend against modern threats both inside and outside the currently protected RF spectrum. | | | | | |
| ***FY 2020 Base Plans:***<br>Perform EW vulnerability studies/analysis, product development and test conducted for the ALQ-214 system on the F/A-18 C/D and E/F for both USMC and Navy aircraft. Develop, model and test advanced electronic countermeasure algorithms for USMC and Navy aircraft to defend against modern threats both inside and outside the currently protected RF spectrum. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3308 / *Technology Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $.111M due to emerging threats outside currently protected RF spectrum. This requires additional algorithms development and testing. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.276 | 6.108 | 6.238 | 0.000 | 6.238 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Electronic Warfare/vulnerability studies/analysis, product development and test conducted for strike aircraft across the Future Years Defense Program (FYDP).

**E. Performance Metrics**

Electronic Warfare (EW) vulnerability studies/analysis, product development and test conducted for strike aircraft across the FYDP. Updated Threat Models and Algorithms are released in EW Suite Updates and posted to Naval Data Distribution System (NDDS). Once available on NDDS, Fleet Maintainers download and install the EW Suite to all applicable aircraft.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3308 / *Technology Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Dev - ALQ-214 SW Dev | SS/CPFF | Harris : Clifton,NJ | 0.000 | 0.545 | Nov 2017 | 0.900 | Jan 2019 | 1.190 | Jan 2020 | - | | 1.190 | Continuing | Continuing | Continuing |
| Software Dev - ALQ-214 SW Dev | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 2.233 | Dec 2018 | 2.010 | Dec 2019 | - | | 2.010 | 0.000 | 4.243 | - |
| Software Dev - ALQ-214 SW Dev | MIPR | Wright Patterson AFB : Dayton, OH | 0.000 | 0.000 | | 2.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.500 | - |
| | | **Subtotal** | 0.000 | 0.545 | | 5.633 | | 3.200 | | - | | 3.200 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Dev - ALQ-214 SW Dev | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.000 | | 0.836 | Nov 2019 | - | | 0.836 | Continuing | Continuing | Continuing |
| Software Dev - ALQ-214 SW Dev | C/CPFF | Johns Hopkins : Baltimore, MD | 0.000 | 0.000 | | 0.475 | Feb 2019 | 0.260 | Nov 2019 | - | | 0.260 | Continuing | Continuing | Continuing |
| Software Dev - ALQ-214 SW Dev | C/BA | Leidos : Arlington, VA | 0.000 | 1.000 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Dev - ALQ-214 SW Dev | WR | NRL : Arlington, VA | 0.000 | 0.075 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.075 | - |
| | | **Subtotal** | 0.000 | 1.075 | | 0.475 | | 1.096 | | - | | 1.096 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

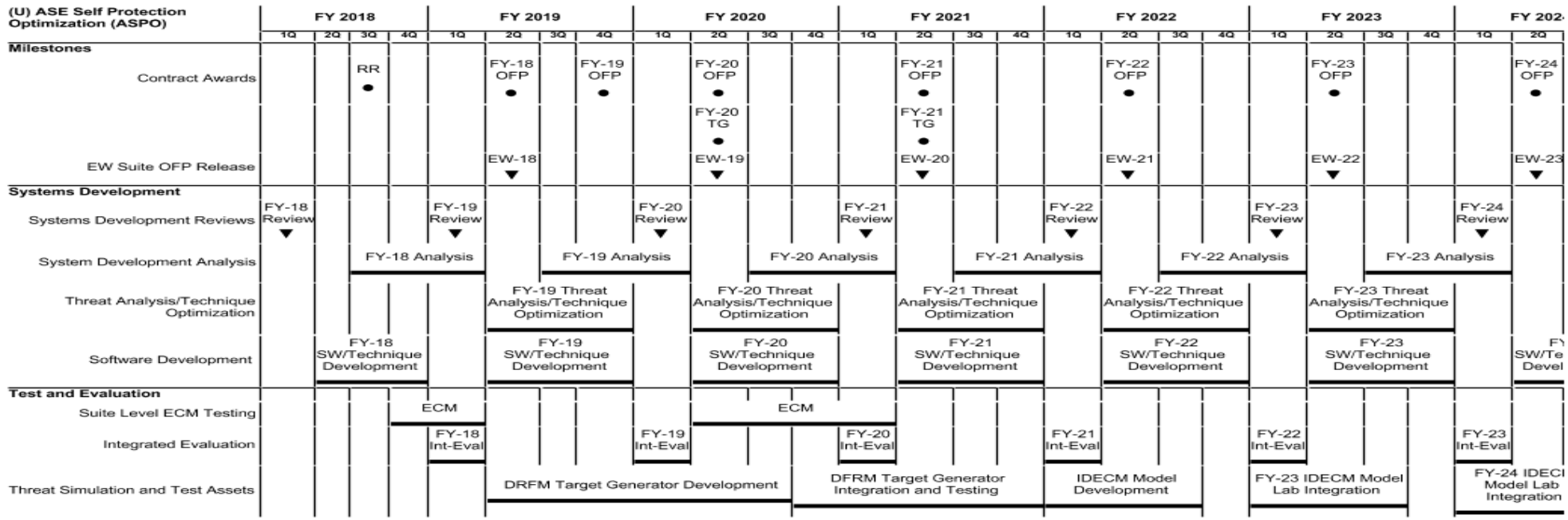
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering & Evaluation | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.000 | | 1.502 | Nov 2019 | - | | 1.502 | Continuing | Continuing | Continuing |
| Engineering & Evaluation | WR | Various : Various | 0.000 | 0.656 | Dec 2017 | 0.000 | | 0.440 | Nov 2019 | - | | 0.440 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.656 | | 0.000 | | 1.942 | | - | | 1.942 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3308 / *Technology Development* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 2.276 | | 6.108 | | 6.238 | | - | | 6.238 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3308 / *Technology Development* |




*2020PB - 0604270N - 3308*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3308 / *Technology Development* |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3308 / *Technology Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***(U) ASE Self Protection Optimization (ASPO)*** | | | | |
| Milestones: Contract Awards: ARC Risk Reduction | 3 | 2018 | 3 | 2018 |
| Milestones: Contract Awards: FY-18 Operational Flight Program | 2 | 2019 | 2 | 2019 |
| Milestones: Contract Awards: FY-19 Operational Flight Program | 4 | 2019 | 4 | 2019 |
| Milestones: Contract Awards: FY-20 Operational Flight Program | 2 | 2020 | 2 | 2020 |
| Milestones: Contract Awards: FY-21 Operational Flight Program | 2 | 2021 | 2 | 2021 |
| Milestones: Contract Awards: FY-22 Operational Flight Program | 2 | 2022 | 2 | 2022 |
| Milestones: Contract Awards: FY-23 Operational Flight Program | 2 | 2023 | 2 | 2023 |
| Milestones: Contract Awards: FY-24 Operational Flight Program | 2 | 2024 | 2 | 2024 |
| Milestones: Contract Awards: FY-20 Target Generator | 2 | 2020 | 2 | 2020 |
| Milestones: Contract Awards: FY-21 Target Generator | 2 | 2021 | 2 | 2021 |
| Milestones: EW Suite OFP Release: Release-18 | 2 | 2019 | 2 | 2019 |
| Milestones: EW Suite OFP Release: Release-19 | 2 | 2020 | 2 | 2020 |
| Milestones: EW Suite OFP Release: Release-20 | 2 | 2021 | 2 | 2021 |
| Milestones: EW Suite OFP Release: Release-21 | 2 | 2022 | 2 | 2022 |
| Milestones: EW Suite OFP Release: Release-22 | 2 | 2023 | 2 | 2023 |
| Milestones: EW Suite OFP Release: Release-23 | 2 | 2024 | 2 | 2024 |
| Systems Development: Systems Development Reviews: FY-18 Review | 1 | 2018 | 1 | 2018 |
| Systems Development: Systems Development Reviews: FY-19 Review | 1 | 2019 | 1 | 2019 |
| Systems Development: Systems Development Reviews: FY-20 Review | 1 | 2020 | 1 | 2020 |
| Systems Development: Systems Development Reviews: FY-21 Review | 1 | 2021 | 1 | 2021 |
| Systems Development: Systems Development Reviews: FY-22 Review | 1 | 2022 | 1 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3308 / *Technology Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Systems Development Reviews: FY-23 Review | 1 | 2023 | 1 | 2023 |
| Systems Development: Systems Development Reviews: FY-24 Review | 1 | 2024 | 1 | 2024 |
| Systems Development: System Development Analysis: FY-18 Analysis | 3 | 2018 | 1 | 2019 |
| Systems Development: System Development Analysis: FY-19 Analysis | 3 | 2019 | 1 | 2020 |
| Systems Development: System Development Analysis: FY-20 Analysis | 3 | 2020 | 1 | 2021 |
| Systems Development: System Development Analysis: FY-21 Analysis | 3 | 2021 | 1 | 2022 |
| Systems Development: System Development Analysis: FY-22 Analysis | 3 | 2022 | 1 | 2023 |
| Systems Development: System Development Analysis: FY-23 Analysis | 3 | 2023 | 1 | 2024 |
| Systems Development: System Development Analysis: FY-24 Analysis | 3 | 2024 | 4 | 2024 |
| Systems Development: Threat Analysis/Technique Optimization: FY-19 Threat Analysis/Technique Optimization | 2 | 2019 | 4 | 2019 |
| Systems Development: Threat Analysis/Technique Optimization: FY-20 Threat Analysis/Technique Optimization | 2 | 2020 | 4 | 2020 |
| Systems Development: Threat Analysis/Technique Optimization: FY-21 Threat Analysis/Technique Optimization | 2 | 2021 | 4 | 2021 |
| Systems Development: Threat Analysis/Technique Optimization: FY-22 Threat Analysis/Technique Optimization | 2 | 2022 | 4 | 2022 |
| Systems Development: Threat Analysis/Technique Optimization: FY-23 Threat Analysis/Technique Optimization | 2 | 2023 | 4 | 2023 |
| Systems Development: Threat Analysis/Technique Optimization: FY-24 Threat Analysis/Technique Optimization | 2 | 2024 | 4 | 2024 |
| Systems Development: Software Development: FY-18 SW/Technique Development | 2 | 2018 | 4 | 2018 |
| Systems Development: Software Development: FY-19 SW/Technique Development | 2 | 2019 | 4 | 2019 |
| Systems Development: Software Development: FY-20 SW/Technique Development | 2 | 2020 | 4 | 2020 |
| Systems Development: Software Development: FY-21 SW/Technique Development | 2 | 2021 | 4 | 2021 |
| Systems Development: Software Development: FY-22 SW/Technique Development | 2 | 2022 | 4 | 2022 |
| Systems Development: Software Development: FY-23 SW/Technique Development | 2 | 2023 | 4 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3308 / *Technology Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Software Development: FY-24 SW/Technique Development | 2 | 2024 | 4 | 2024 |
| Test and Evaluation: Suite Level ECM Testing: FY18 ECM Testing | 4 | 2018 | 1 | 2019 |
| Test and Evaluation: Suite Level ECM Testing: FY20 ECM Testing | 2 | 2020 | 1 | 2021 |
| Test and Evaluation: Integrated Evaluation: FY-18 Integrated Evaluation | 1 | 2019 | 1 | 2019 |
| Test and Evaluation: Integrated Evaluation: FY-19 Integrated Evaluation | 1 | 2020 | 1 | 2020 |
| Test and Evaluation: Integrated Evaluation: FY-20 Integrated Evaluation | 1 | 2021 | 1 | 2021 |
| Test and Evaluation: Integrated Evaluation: FY-21 Integrated Evaluation | 1 | 2022 | 1 | 2022 |
| Test and Evaluation: Integrated Evaluation: FY-22 Integrated Evaluation | 1 | 2023 | 1 | 2023 |
| Test and Evaluation: Integrated Evaluation: FY-23 Integrated Evaluation | 1 | 2024 | 1 | 2024 |
| Test and Evaluation: Threat Simulation and Test Assets: Digital Radio Frequency Memory (DFRM) Target Generator Development | 2 | 2019 | 3 | 2020 |
| Test and Evaluation: Threat Simulation and Test Assets: DFRM Target Generator Integration and Testing | 4 | 2020 | 4 | 2021 |
| Test and Evaluation: Threat Simulation and Test Assets: IDECM Model Development | 1 | 2022 | 3 | 2022 |
| Test and Evaluation: Threat Simulation and Test Assets: FY-23 IDECM Model Lab Integration | 1 | 2023 | 3 | 2023 |
| Test and Evaluation: Threat Simulation and Test Assets: FY-24 IDECM Model Lab Integration | 1 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3309 / *Assault Survivability Optimization* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3309: *Assault Survivability Optimization* | 3.484 | 0.848 | 0.836 | 6.910 | - | 6.910 | 0.842 | 0.861 | 0.878 | 0.895 | Continuing | Continuing |
| Quantity of RDT&E Articles | 480 | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Program was established to fill aircraft survivability gaps against current and future threat systems. This project addresses the Air Expendable Countermeasures (AECM) requirement maintaining a portfolio of countermeasures capable of defeating current and advancing surface-to-air and air-to-air threat missile systems to include the development, testing, and rapid fielding of advanced countermeasures and enhanced employment techniques needed to support fleet combat operations. Countermeasure dispensing techniques are developed using capability advancements tied to integrated Aircraft Survivability Equipment (iASE) investments by leveraging available sensor data in the iASE Suite. Improved countermeasure dispense techniques are rapidly delivered to operational Fleet aircraft thru Mission Data File updates via established software update processes. Also, new expendable countermeasure technology developed in industry, by other DoD Components and through other R&D programs can be transitioned to AECM Program of Record meet the required operational platform survivability without further investment in iASE systems. This Project also includes/enables iASE which improves situational awareness for own-ship, wingman, and distributed command and control. Resources will be applied to the following areas:

1) Studies and evaluations to optimize employment of current countermeasures and iASE capabilities.
2) Development and demonstration of advanced expendable countermeasures and countermeasure techniques.
3) Testing and evaluation of advanced countermeasures.
4) Development of system software enhancements and integration for the testing and deployment of advanced countermeasure techniques.
5) Development of and upgrades to modeling tools and specialized equipment required to conduct evaluation of advanced countermeasures against proliferating threats.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Assault Survivability Optimization | 0.848 | 0.836 | 6.910 | 0.000 | 6.910 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue development and testing of advanced countermeasure techniques and upgrade specialized evaluation equipment for advancing threat systems. Perform modeling and simulation and effectiveness ground to air flight testing of 1X1X8 advanced countermeasure flares for F/A-18E/F. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue development and testing of advanced countermeasure techniques and upgrade specialized evaluation equipment for advancing threat systems. Perform modeling and simulation to support effectiveness flight testing of 1X1X8 advanced countermeasure flares for F/A-18E/F against air-to-air threat systems. Perform | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| modeling and simulation to support effectiveness flight testing of advanced countermeasure flares for AH-1Z/ UH-1Y and MV-22 against current emerging threat systems. Perform capability upgrades to test equipment to evaluated countermeasure effectiveness. Perform modeling, simulation and testing of advanced radio frequency countermeasure. Develop advance countermeasures to defeat merging threats.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 increase of $6.1M prioritized by USMC to fill existing, known capability shortfalls to address critical gaps in survivability against current and emerging threat systems thereby endangering USMC platforms. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.848 | 0.836 | 6.910 | 0.000 | 6.910 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Acquisition strategy is to leverage improvements in air expendable countermeasures technology and integration of existing iASE sensor data to enhance platform survivability on USN and USMC platforms through more effective dispense techniques, investing in enhancements in modeling and simulation tools to better evaluate countermeasure effectiveness, upgrading test and evaluation equipment to incorporate current and future threats for effectiveness tests, and developing and demonstrating advanced concept countermeasures for future threats. New advanced countermeasures are then transitioned to the Procurement of Ammunition Navy and Marine Corps appropriation for procurement and fielding. New optimized and advanced countermeasure techniques are delivered via operational Mission Data Files (MDF) to increase aircraft/aircrew survivability.

**E. Performance Metrics**

Maintain capability requirements established in AECM ORD: #512-88-89 dated 28 May 1999 to provide operationally effective mixture of countermeasures that can be employed to degrade and/or neutralize the effectiveness of current and projected Electro Optic (EO), Infrared (IR), Radio Frequency (RF) and Ultra-violet (UV) threat missile systems. Continued development of optimized countermeasure techniques and advance countermeasures by on-going analysis and test flight efforts related to aircraft platform survivability based on global threat development and proliferation. Testing of countermeasure techniques developed for improved survivability is supported by Statement of Functionality for Aircraft Survivability Equipment Smart Dispense, dated 19 January 2012. Project Unit 3309 efforts will continue due to advanced threat proliferation, on-going technology advances in countermeasures and fielding of iASE capability advancements within the EO, IR, RF and UV spectrums. Project will include efforts to satisfy USN and USMC aircraft self-protection against advanced Man-Portable Air Defense Systems (MANPADs).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expendable Countermeasure Technique Modeling and Simulation | WR | NSWC Crane : Crane, IN | 0.773 | 0.469 | Oct 2017 | 0.423 | Oct 2018 | 0.406 | Oct 2019 | - | | 0.406 | Continuing | Continuing | Continuing |
| Archive Radio Frequency Countermeasures Modeling and Simulation efforts no funding through FYDP | WR | NSWC Crane : Crane, IN | 0.715 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.715 | 0.715 |
| RFCM Modeling and Simulation | C/CPFF | GTRI : Altanta, GA | 0.000 | 0.050 | Oct 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| 1x1x8 Expendable Countermeasure Technique Modeling and Simulation | WR | NSWC Crane : Crane, IN | 0.070 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| AH-1Z/UH-1Y and MV-22 Expendable Countermeasure Technique Modeling and Simulation | WR | NSWC Crane : Crane, IN | 0.000 | 0.000 | | 0.000 | | 0.778 | Oct 2019 | - | | 0.778 | Continuing | Continuing | Continuing |
| AH-1Z/UH-1Y and MV-22 RFCM Modeling and Simulation | WR | NSWC Crane : Crane, IN | 0.000 | 0.000 | | 0.000 | | 0.275 | Oct 2019 | - | | 0.275 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.558 | 0.519 | | 0.423 | | 1.459 | | - | | 1.459 | Continuing | Continuing | N/A |

**Remarks**

Infrared (IR) Decoys: FY 2020 modeling and simulation funding supports the development of advanced countermeasure techniques prior to air to air flight test for F/A-18 and ground to air flight test for AH-1Z/UH-1Y and MV-22. Initiated modeling and simulation and engineering and evaluation in FY 2017 to determine applicability of 1x1x8 countermeasures on Navy aircraft. The program anticipates funding 1X1X8 modeling and simulation in FY 2021.

Radio Frequency (RF) Decoys: FY 2020 modeling and simulation funding supports modeling and simulation of advanced RF decoys on USMC platforms. FY 2018 Radio Frequency Countermeasure (RFCM) Joint Aircraft Survivability Program (JASP) award to perform modeling and simulation for future active RF decoy.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Mission Data File Software Development | WR | FRCSE : Jacksonville, FL | 0.240 | 0.070 | Jan 2018 | 0.071 | Dec 2018 | 0.072 | Dec 2019 | - | | 0.072 | Continuing | Continuing | Continuing |
| AH-1Z/UH-1Y and MV-22 Test Mission Data File Software Development | WR | FRCSE : Jacksonville, FL | 0.000 | 0.000 | | 0.000 | | 0.201 | Dec 2019 | - | | 0.201 | Continuing | Continuing | Continuing |
| AH-1Z/UH-1Y and MV-22 Operational Mission Data File Software Development and Release | WR | FRCSE : Jacksonville, FL | 0.000 | 0.000 | | 0.000 | | 0.465 | Mar 2020 | - | | 0.465 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.240 | 0.070 | | 0.071 | | 0.738 | | - | | 0.738 | Continuing | Continuing | N/A |

**Remarks**

FY 2020 Software development funding supports the creation of test Mission Data Files (MDF) and enhanced operational flight program algorithms for flight effectiveness testing for F/A-18E/F, AH-1Z/UH-1Y and MV-22.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T&E Flight Tests | WR | Various : Various | 0.544 | 0.031 | Jun 2018 | 0.342 | Mar 2019 | 0.276 | Mar 2020 | - | | 0.276 | Continuing | Continuing | Continuing |
| Archive Test and Evaluation Efforts no funding through FYDP | Various | Various : Various | 0.698 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.698 | 0.698 |
| Archive 1x1x8 Engineering and Evaluation no funding through FYDP | Various | Various : Various | 0.277 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.277 | 0.277 |
| 1x1x8 Engineering and Evaluaion | MIPR | Apexx Enterprises : Montgomery, IN | 0.065 | 0.128 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.193 | 0.193 |
| AH-1Z/UH-1Y and MV-22 Developmental T&E Flight Tests | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.749 | Mar 2020 | - | | 0.749 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3309 / *Assault Survivability Optimization* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RFCM Millimeter Wave Testing | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.180 | Mar 2020 | - | | 0.180 | Continuing | Continuing | Continuing |
| Advanced Countermeasures Development and MJU-67 Re-design | WR | NSWC Crane : Crane, IN | 0.000 | 0.000 | | 0.000 | | 0.625 | Oct 2019 | - | | 0.625 | Continuing | Continuing | Continuing |
| Advance Threat Simulator Hardware in the Loop Simulator | WR | NSWC Crane : Crane, IN | 0.000 | 0.000 | | 0.000 | | 0.288 | Jan 2020 | - | | 0.288 | Continuing | Continuing | Continuing |
| Threat Analysis and Characterization and Signature Measurement Capability for Seeker Test Van Capability Upgrades | WR | NSWC Crane : Crane, IN | 0.000 | 0.000 | | 0.000 | | 1.019 | Oct 2019 | - | | 1.019 | Continuing | Continuing | Continuing |
| Engineering and Evaluation for Advance Countermeasure Composition | MIPR | Orbital ATK : Arlington, VA | 0.000 | 0.000 | | 0.000 | | 0.278 | Mar 2020 | - | | 0.278 | 0.000 | 0.278 | 0.278 |
| Capability Upgrades for Tiger Pod Infrared Measurement and AICES Pod | WR | NAWCWD : Pt Mugu, CA | 0.000 | 0.000 | | 0.000 | | 0.575 | Dec 2019 | - | | 0.575 | Continuing | Continuing | Continuing |
| Capability Upgrades for Mongoose Pod | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.128 | Dec 2019 | - | | 0.128 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.584 | 0.159 | | 0.342 | | 4.118 | | - | | 4.118 | Continuing | Continuing | N/A |

**Remarks**

FY 2019 Developmental T&E flight test following modeling and simulation evaluation will optimize expendable countermeasure effectiveness and determine applicability of 1x1x8 countermeasures for F/A-18E/F against ground to air threats. FY 2020 Developmental T&E flight test following modeling and simulation evaluation will optimize expendable countermeasure effectiveness and determine applicability of 1x1x8 countermeasures for F/A-18E/F against air to air threats. Developmental T&E flight test following modeling and simulation evaluation will optimize expendable countermeasure effectiveness for AH-1Z/UH-1Y and MV-22. FY 2020 advanced countermeasure development and engineering will determine solutions to defeat advanced threats in multiple spectrums. FY 2020 test equipment capability upgrades will improve countermeasure test equipment to evaluate effectiveness against advanced threats.

FY 2018 flight test cost updated for actuals. Increase from FY 2018 to FY 2019 above inflation due to higher flight test cost for F/A-18E/F aircraft platform. Initiated engineering and evaluation to determine applicability of 1x1x8 countermeasures on Navy aircraft platforms.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Management | WR | FRCSE : Jacksonville, FL | 0.102 | 0.100 | Oct 2017 | 0.000 | | 0.056 | Oct 2019 | - | | 0.056 | Continuing | Continuing | Continuing |
| AH-1Z/UH-1Y and MV-22 Advanced Countermeasure Dispense Technique Development Project Management | WR | FRCSE : Jacksonville, FL | 0.000 | 0.000 | | 0.000 | | 0.302 | Oct 2019 | - | | 0.302 | Continuing | Continuing | Continuing |
| USMC Common Carriage Survey and Evaluation Study | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.237 | Jan 2020 | - | | 0.237 | 0.000 | 0.237 | 0.237 |
| | | **Subtotal** | 0.102 | 0.100 | | 0.000 | | 0.595 | | - | | 0.595 | Continuing | Continuing | N/A |

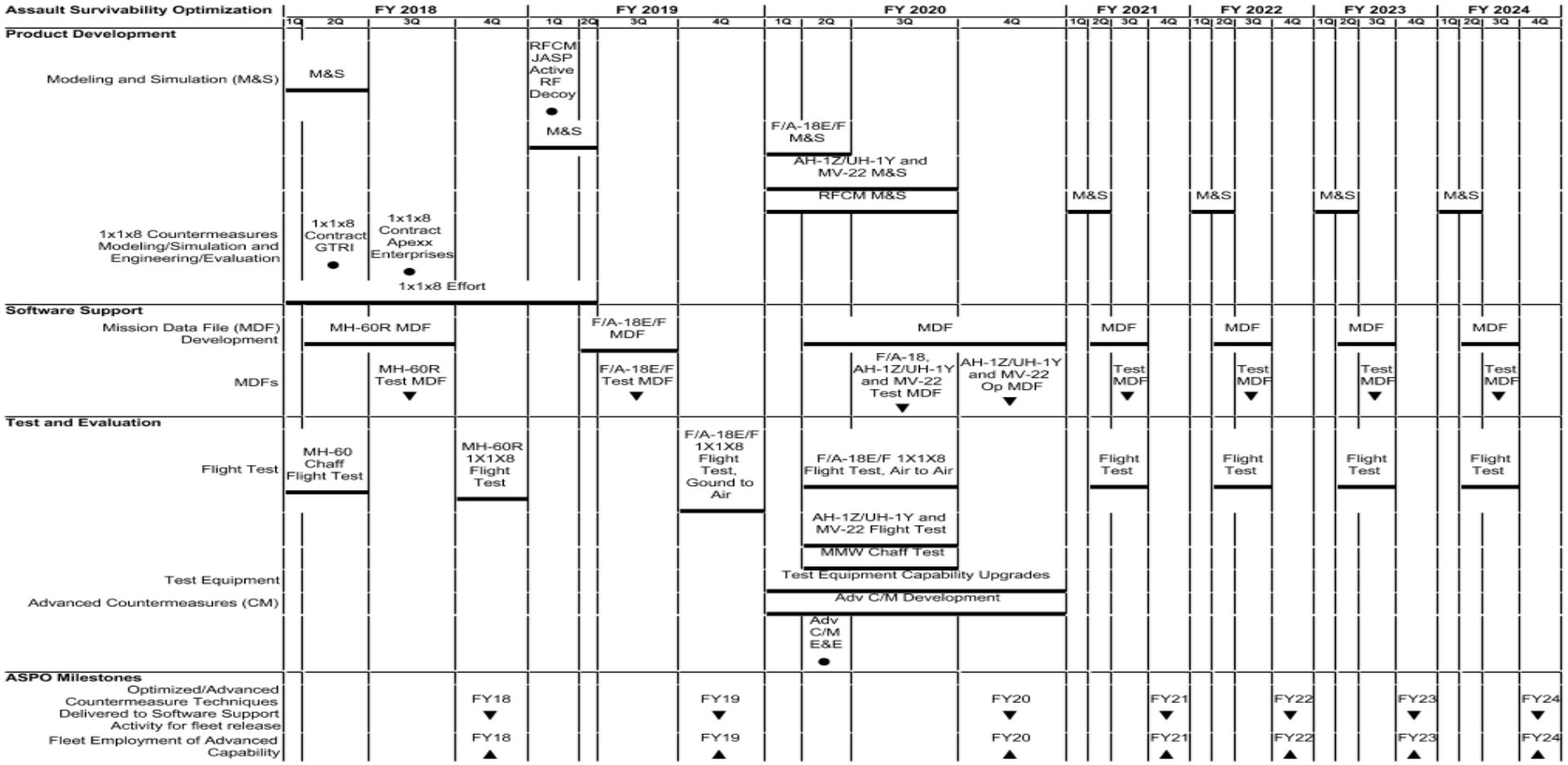
**Remarks**

Project management required to coordinate increased development activities for Navy and USMC platforms. USMC Common Carriage Survey funding will determine applicability of converting USCM aircraft platforms from round to square countermeasures.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 3.484 | 0.848 | | 0.836 | | 6.910 | | - | | 6.910 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |




*2020PB - 0604270N - 3309 Project 3309 moved from PE 0604279N to PE 0604270N in FY 2017*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Assault Survivability Optimization*** | | | | |
| Product Development: Modeling and Simulation (M&S): FY18 Modeling and Simulation | 1 | 2018 | 2 | 2018 |
| Product Development: Modeling and Simulation (M&S): RFCM Modeling and Simulation for active radio frequency decoy | 1 | 2019 | 1 | 2019 |
| Product Development: Modeling and Simulation (M&S): FY19 Modeling and Simulation | 1 | 2019 | 2 | 2019 |
| Product Development: Modeling and Simulation (M&S): FY20 Modeling and Simulation | 1 | 2020 | 2 | 2020 |
| Product Development: Modeling and Simulation (M&S): AH-1Z/UH-1Y and MV-22 FY20 Modeling and Simulation | 1 | 2020 | 3 | 2020 |
| Product Development: Modeling and Simulation (M&S): FY20 RFCM Modeling and Simulation | 1 | 2020 | 3 | 2020 |
| Product Development: Modeling and Simulation (M&S): FY21 Modeling and Simulation | 1 | 2021 | 2 | 2021 |
| Product Development: Modeling and Simulation (M&S): FY22 Modeling and Simulation | 1 | 2022 | 2 | 2022 |
| Product Development: Modeling and Simulation (M&S): FY23 Modeling and Simulation | 1 | 2023 | 2 | 2023 |
| Product Development: Modeling and Simulation (M&S): FY24 Modeling and Simulation | 1 | 2024 | 2 | 2024 |
| Product Development: 1x1x8 Countermeasures Modeling/Simulation and Engineering/ Evaluation: 1x1x8 Countermeasures Modeling/Simulation and Engineering/Evaluation Contract Award - GTRI | 2 | 2018 | 2 | 2018 |
| Product Development: 1x1x8 Countermeasures Modeling/Simulation and Engineering/ Evaluation: 1x1x8 Countermeasures Modeling/Simulation and Engineering/Evaluation Contract Award - Apexx | 3 | 2018 | 3 | 2018 |
| Product Development: 1x1x8 Countermeasures Modeling/Simulation and Engineering/ Evaluation: 1x1x8 Countermeasures Modeling/Simulation and Engineering/Evaluation | 1 | 2018 | 2 | 2019 |
| Software Support: Mission Data File (MDF) Development: FY18 Mission Data Files Development | 2 | 2018 | 3 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Software Support: Mission Data File (MDF) Development: FY19 Mission Data Files Development | 2 | 2019 | 3 | 2019 |
| Software Support: Mission Data File (MDF) Development: FY20 Mission Data Files Development | 2 | 2020 | 4 | 2020 |
| Software Support: Mission Data File (MDF) Development: FY21 Mission Data Files Development | 2 | 2021 | 3 | 2021 |
| Software Support: Mission Data File (MDF) Development: FY22 Mission Data Files Development | 2 | 2022 | 3 | 2022 |
| Software Support: Mission Data File (MDF) Development: FY23 Mission Data Files Development | 2 | 2023 | 3 | 2023 |
| Software Support: Mission Data File (MDF) Development: FY24 Mission Data Files Development | 2 | 2024 | 3 | 2024 |
| Software Support: MDFs: FY18 Test Mission Data Files | 3 | 2018 | 3 | 2018 |
| Software Support: MDFs: FY19 Test Mission Data Files | 3 | 2019 | 3 | 2019 |
| Software Support: MDFs: FY20 Test Mission Data Files | 3 | 2020 | 3 | 2020 |
| Software Support: MDFs: FY20 Operational Mission Data Files | 4 | 2020 | 4 | 2020 |
| Software Support: MDFs: FY21 Test Mission Data Files | 3 | 2021 | 3 | 2021 |
| Software Support: MDFs: FY22 Test Mission Data Files | 3 | 2022 | 3 | 2022 |
| Software Support: MDFs: FY23 Test Mission Data Files | 3 | 2023 | 3 | 2023 |
| Software Support: MDFs: FY24 Test Mission Data Files | 3 | 2024 | 3 | 2024 |
| Test and Evaluation: Flight Test: FY18 Flight Test | 4 | 2018 | 4 | 2018 |
| Test and Evaluation: Flight Test: Advanced Chaff Flight Test | 1 | 2018 | 2 | 2018 |
| Test and Evaluation: Flight Test: FY19 Flight Test | 4 | 2019 | 4 | 2019 |
| Test and Evaluation: Flight Test: FY20 F/A-18 Flight Test | 2 | 2020 | 3 | 2020 |
| Test and Evaluation: Flight Test: FY21 Flight Test | 2 | 2021 | 3 | 2021 |
| Test and Evaluation: Flight Test: FY22 Flight Test | 2 | 2022 | 3 | 2022 |
| Test and Evaluation: Flight Test: FY23 Flight Test | 2 | 2023 | 3 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: Flight Test: FY24 Flight Test | 2 | 2024 | 3 | 2024 |
| Test and Evaluation: Flight Test: FY20 AH-1Z/UH-1Y and MV-22 Flight Test | 2 | 2020 | 3 | 2020 |
| Test and Evaluation: Flight Test: FY20 MMW Chaff Test | 2 | 2020 | 3 | 2020 |
| Test and Evaluation: Test Equipment: Test Equipment Capability Upgrades | 1 | 2020 | 4 | 2020 |
| Test and Evaluation: Advanced Countermeasures (CM): Advance Countermeasure Development | 1 | 2020 | 4 | 2020 |
| Test and Evaluation: Advanced Countermeasures (CM): Advance Countermeasure Engineering and Evaluation Contract | 2 | 2020 | 2 | 2020 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY18 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2018 | 4 | 2018 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY19 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2019 | 4 | 2019 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 20 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2020 | 4 | 2020 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 21 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2021 | 4 | 2021 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 22 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2022 | 4 | 2022 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 23 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2023 | 4 | 2023 |
| ASPO Milestones: Optimized/Advanced Countermeasure Techniques Delivered to Software Support Activity for fleet release: FY 24 Optimized/Advanced CM Techniques Delivered to SSA for fleet release | 4 | 2024 | 4 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3309 / *Assault Survivability Optimization* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY18 Fleet Employment of Advanced Capability | 4 | 2018 | 4 | 2018 |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY19 Fleet Employment of Advanced Capability | 4 | 2019 | 4 | 2019 |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY20 Fleet Employment of Advanced Capability | 4 | 2020 | 4 | 2020 |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY21 Fleet Employment of Advanced Capability | 4 | 2021 | 4 | 2021 |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY22 Fleet Employment of Advanced Capability | 4 | 2022 | 4 | 2022 |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY23 Fleet Employment of Advanced Capability | 4 | 2023 | 4 | 2023 |
| ASPO Milestones: Fleet Employment of Advanced Capability: FY24 Fleet Employment of Advanced Capability | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3327 / *MAGTF EW Aviation Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3327: *MAGTF EW Aviation Development* | 16.115 | 23.551 | 12.362 | 7.677 | - | 7.677 | 8.136 | 6.717 | 14.382 | 14.664 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This project unit supports the United States Marine Corps (USMC) development of Marine Air Ground Task Force (MAGTF) Electronic Warfare (EW) and the various elements of its distributed System of Systems (SoS). The SoS addresses MAGTF EW sufficiency gaps in the areas of Electronic Attack (EA), EW Support (ES), and Electronic Protection with a multitude of payloads designed for carriage on a variety of organic MAGTF air assets. Payload development plans follow an adaptable, modular and open architecture philosophy to combat the increasing capability gap and enable future growth at a reduced operational and sustainment cost. A key element to this capability is the AN/ALQ-231(V) Intrepid Tiger II program.

The AN/ALQ-231(V)1 pod is the variant of the Intrepid Tiger II pod flown on the AV-8B and F/A-18A-D platforms, with plans for future integration of AN/ALQ-231(V)1 Block X on MV-22, C-130, and CH-53K platforms. The AN/ALQ-231(V)3 is the variant of the Intrepid Tiger II pod flown on the UH-1Y platform, with plans for future integration on AH-1 platforms. All payload variants are capable of conducting, supporting, and coordinating Electro-Magnetic Spectrum (EMS) operations in the form of EA and ES against Irregular Warfare threats. Additionally, all payloads are scalable and adaptable for emerging threats and are interoperable with the USMC's Electronic Warfare Services Architecture (EWSA). The Intrepid Tiger II capability is design to be integrated for MAGTF tactical coordination of cyberspace and EW operations via the Cyber Electronic Warfare Coordination Cell (CEWCC).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Intrepid Tiger II (AN/ALQ-231) | 21.051 | 9.811 | 5.075 | 0.000 | 5.075 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The program will continue efforts to develop, mature, and test Intrepid Tiger II based solutions to radar threats in support of the penetrating jammer mission with plans to release variants of the AN/ALQ-231(V)1 BLK X Radar Jammer for use on the MV-22, AV-8B, and F/A-18C/D platforms, as well as for future use on the C-130 and CH-53K. FY 2019 efforts will include the continued maturation of BLK X EDM design for both a modular pod shell and a cabin rack-mounted solution and the correction of developmental test deficiencies. In addition, integrated Developmental Testing (DT) of the rack-mounted solution for the MV-22 will commence. The program will also continue BLK X software development efforts to support DT. Additionally, development of the EWSA in support of evolving Intrepid Tiger II target sets and missions shall continue in FY 2019. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The program will continue efforts to develop, mature, and test Intrepid Tiger II based solutions to radar threats in support of the penetrating jammer mission with plans to release variants of the AN/ALQ-231(V)1 BLK X Radar Jammer for use on the MV-22, AV-8B, and F/A-18C/D platforms, as well as for future use on the C-130 and CH-53K. FY 2020 efforts will include the finalization of BLK X EDM rack-mounted design and its initial integration on the MV-22 platform. Additionally, integrated Developmental Test (DT) and evaluation of both BLK X software and hardware will be completed on MV-22.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decreases from FY 2019 to FY 2020 due to funding request reduction by $5.600 million to account for the availability of prior year execution balances. | | | | | |
| ***Title:*** MAGTF EW Jammer Techniques Development | 2.500 | 2.551 | 2.602 | 0.000 | 2.602 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 will continue efforts to significantly increase the Marine Corps' cyberspace and Electronic Warfare expertise via the development of new and updated jammer techniques. These techniques will be designed to exploit the interrelated cyberspace domain and the electromagnetic spectrum (EMS) through the development, validation, and delivery of MAGTF EW-specific Tactics, Techniques, and Procedures (TTPs) and testing of MAGTF EW systems against existing and emerging threats. Additional efforts include the acquisition of simulators to better emulate threshold and objective threats for MAGTF EW systems.<br>***FY 2020 Base Plans:***<br>FY 2020 will continue efforts to advance the development of new and updated EW jammer techniques. These techniques will be designed to exploit the interrelated cyberspace domain and the electromagnetic spectrum (EMS) through the development, validation, and delivery of MAGTF EW-specific Tactics, Techniques, and Procedures (TTPs) and the testing of MAGTF EW systems against existing and emerging threats. FY 2020 efforts will include the test and evaluation of counter-radar technique performance and effectiveness of BLK X on MV-22 during Developmental Testing.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Funding increases from FY 2019 to FY 2020 due to BLK X jammer technique testing in FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 23.551 | 12.362 | 7.677 | 0.000 | 7.677 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0587: *MAGTF EW For Aviation* | 10.111 | 11.590 | 26.536 | - | 26.536 | 30.922 | 33.629 | 24.380 | 24.865 | 97.777 | 380.263 |

**Remarks**

**D. Acquisition Strategy**

This project unit is part of USMC led efforts to ensure Marine Corps requirements are included in the budget process for the Future Year Defense Program and beyond. These efforts include AN/ALQ-231(V) Intrepid Tiger II Family of Systems, Collaborative Electronic Warfare (EW)/EW Battle Management, and EW Service Architecture (EWSA). These programs are the Marine Corps' initial steps to create systems to distribute EW capability across the battlespace.

**E. Performance Metrics**

Continuation of research into Engineering Change Proposals (ECPs) for capability upgrades for AN/ALQ-231(V) Intrepid Tiger II pods to keep pace with the migrating and expanding EW target sets in theatre.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intrepid Tiger BLK X Hardware Development | WR | NAWCWD : Point Mugu, CA | 4.683 | 10.947 | Dec 2017 | 2.579 | Nov 2018 | 0.483 | Nov 2019 | - | | 0.483 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.539 | 0.838 | Dec 2017 | 0.476 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCWD : Point Mugu, CA | 8.588 | 9.716 | Dec 2017 | 6.488 | Nov 2018 | 4.299 | Nov 2019 | - | | 4.299 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 13.810 | 21.501 | | 9.543 | | 4.782 | | - | | 4.782 | Continuing | Continuing | N/A |

**Remarks**

Funding decrease from FY 2019 to FY 2020 due to BLK X transitioning from development to DT.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | Various : Various | 0.000 | 0.430 | Feb 2018 | 0.443 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Eng & Tech Services | Various | Various : Various | 0.262 | 0.105 | Feb 2018 | 0.107 | Nov 2018 | 0.109 | Nov 2019 | - | | 0.109 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.262 | 0.535 | | 0.550 | | 0.109 | | - | | 0.109 | Continuing | Continuing | N/A |

**Remarks**

Funding decrease from FY19 to FY20 for developmental support due to the availability of prior year funding.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intrepid Tiger BLK X Testing | WR | NAWCAD : Patuxent River, MD | 1.062 | 0.000 | | 0.000 | | 0.850 | Nov 2019 | - | | 0.850 | Continuing | Continuing | Continuing |
| Intrepid Tiger BLK X Testing | WR | NAWCWD : Point Mugu, CA | 0.893 | 1.397 | Dec 2017 | 2.149 | Nov 2018 | 1.515 | Nov 2019 | - | | 1.515 | Continuing | Continuing | Continuing |
| Intrepid Tiger BLK X Testing | Various | Various : Various | 0.053 | 0.082 | Jan 2018 | 0.084 | Nov 2018 | 0.385 | Nov 2019 | - | | 0.385 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 2.008 | 1.479 | | 2.233 | | 2.750 | | - | | 2.750 | Continuing | Continuing | N/A |

**Remarks**

Funding increase from FY 2019 to FY 2020 due to AN/ALQ-231(V)1 BLK X Developmental Test activities.

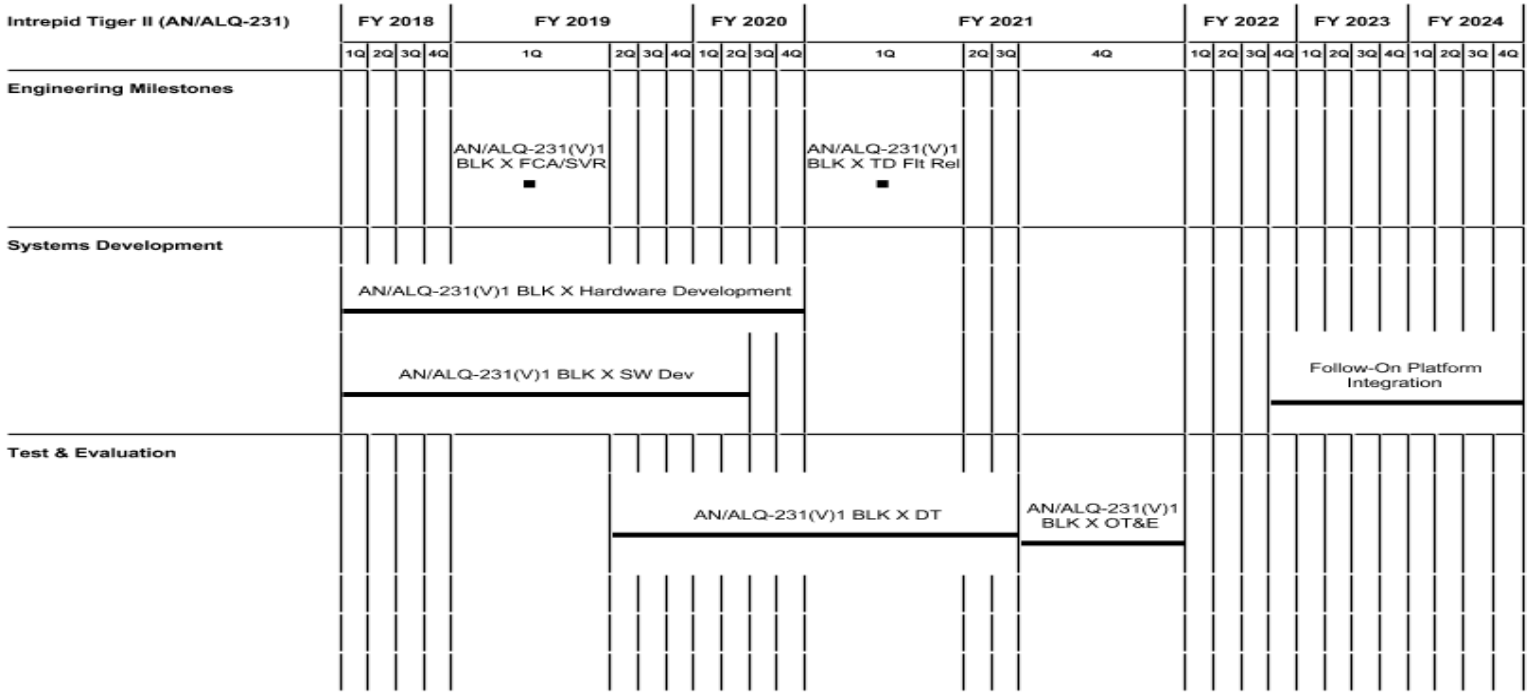
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | Various : Various | 0.035 | 0.036 | Oct 2017 | 0.036 | Oct 2018 | 0.036 | Oct 2019 | - | | 0.036 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.035 | 0.036 | | 0.036 | | 0.036 | | - | | 0.036 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 16.115 | 23.551 | | 12.362 | | 7.677 | | - | | 7.677 | Continuing | Continuing | N/A |

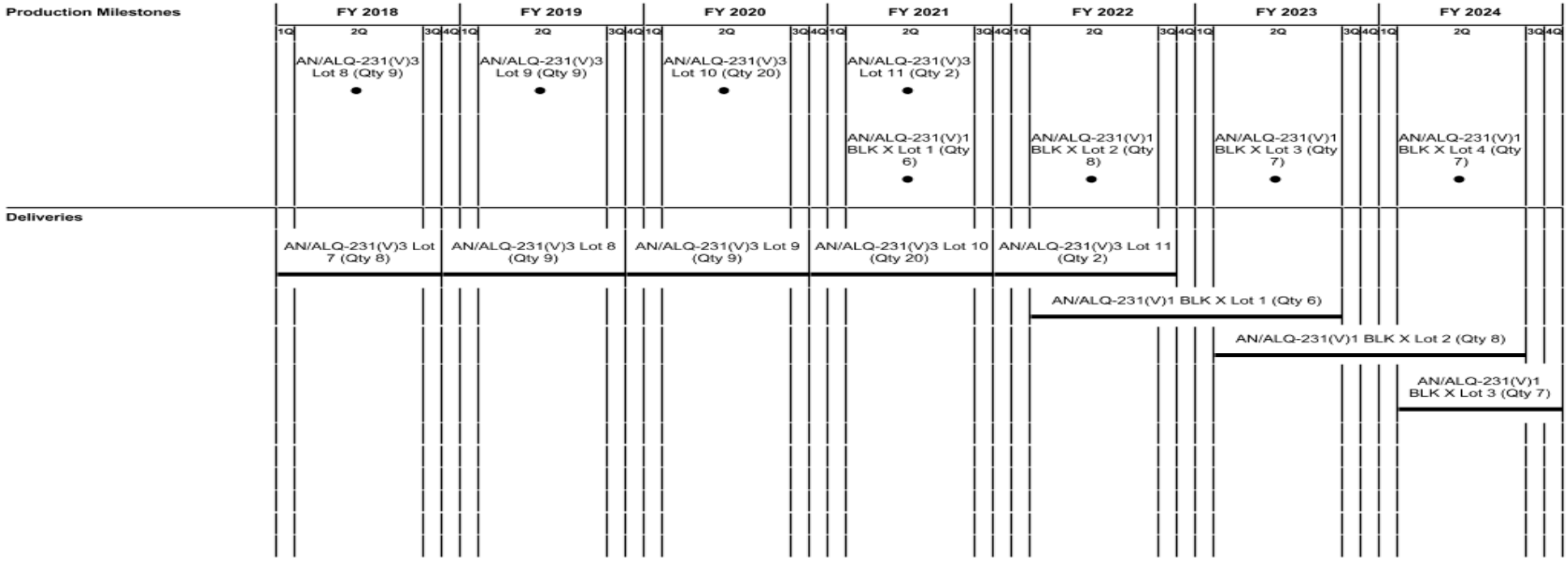
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |



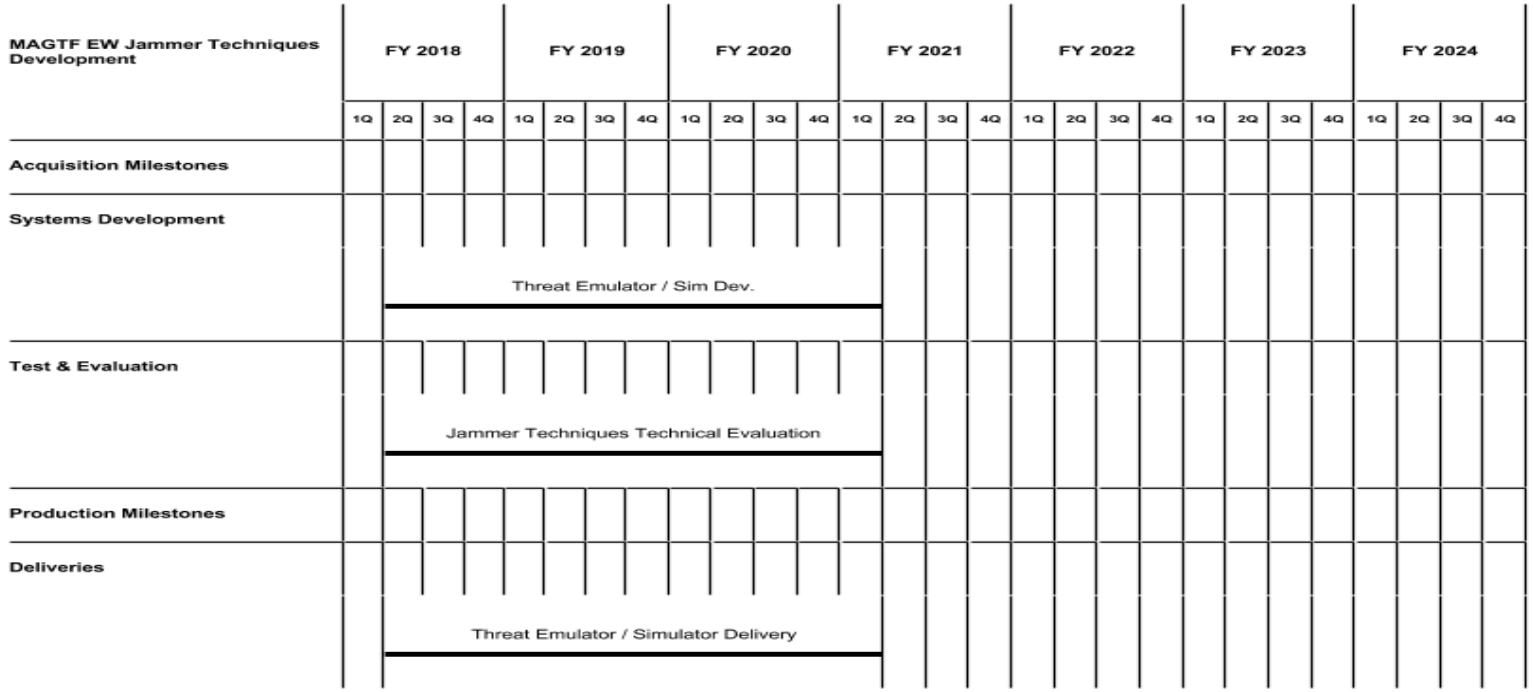

2020PB - 0604270N - 3327

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |




*2020PB - 0604270N - 3327*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |




*2020PB - 0604270N - 3327*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Intrepid Tiger II (AN/ALQ-231)*** | | | | |
| Engineering Milestones: AN/ALQ-231(V)1 BLK X Functional Configuration Audit / System Verification Review | 1 | 2019 | 1 | 2019 |
| Engineering Milestones: AN/ALQ-231(V)1 BLK X TD Fleet Release | 1 | 2021 | 1 | 2021 |
| Systems Development: AN/ALQ-231(V)1 BLK X Hardware Development | 1 | 2018 | 4 | 2020 |
| Systems Development: AN/ALQ-231(V)1 BLK X Software Development | 1 | 2018 | 2 | 2020 |
| Systems Development: Follow-On Platform Integration | 4 | 2022 | 4 | 2024 |
| Test & Evaluation: AN/ALQ-231(V)1 BLK X Developmental Test | 2 | 2019 | 3 | 2021 |
| Test & Evaluation: AN/ALQ-231(V)1 BLK X OT&E | 4 | 2021 | 4 | 2021 |
| ***Production Milestones*** | | | | |
| AN/ALQ-231(V)3 Production Lot 8 (Qty 9) | 2 | 2018 | 2 | 2018 |
| AN/ALQ-231(V)3 Production Lot 9 (Qty 9) | 2 | 2019 | 2 | 2019 |
| AN/ALQ-231(V)3 Production Lot 10 (Qty 20) | 2 | 2020 | 2 | 2020 |
| AN/ALQ-231(V)3 Production Lot 11 (Qty 2) | 2 | 2021 | 2 | 2021 |
| AN/ALQ-231(V)1 BLK X Production Lot 1 ( Qty 6) | 2 | 2021 | 2 | 2021 |
| AN/ALQ-231(V)1 BLK X Production Lot 2 (Qty 8) | 2 | 2022 | 2 | 2022 |
| AN/ALQ-231(V)1 BLK X Production Lot 3 (Qty 7) | 2 | 2023 | 2 | 2023 |
| AN/ALQ-231(V)1 BLK X Production Lot 4 (Qty 7) | 2 | 2024 | 2 | 2024 |
| Deliveries: AN/ALQ-231(V)3 Lot 7 Deliveries (Qty 8) | 1 | 2018 | 3 | 2018 |
| Deliveries: AN/ALQ-231(V)3 Lot 8 Deliveries (Qty 9) | 4 | 2018 | 3 | 2019 |
| Deliveries: AN/ALQ-231(V)3 Lot 9 Deliveries (Qty 9) | 4 | 2019 | 3 | 2020 |
| Deliveries: AN/ALQ-231(V)3 Lot 10 Deliveries (Qty 20) | 4 | 2020 | 3 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3327 / *MAGTF EW Aviation Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deliveries: AN/ALQ-231(V)3 Lot 11 Deliveries (Qty 2) | 4 | 2021 | 3 | 2022 |
| Deliveries: AN/ALQ-231(V)1 BLK X Lot 1 Deliveries (Qty 6) | 2 | 2022 | 2 | 2023 |
| Deliveries: AN/ALQ-231(V)1 BLK X Lot 2 Deliveries (Qty 8) | 2 | 2023 | 2 | 2024 |
| Deliveries: AN/ALQ-231(V)1 BLK X Lot 3 Deliveries (Qty 7) | 2 | 2024 | 4 | 2024 |
| ***MAGTF EW Jammer Techniques Development*** | | | | |
| Systems Development: Threat Emulator / Simulator Development | 2 | 2018 | 1 | 2021 |
| Test & Evaluation: Jammer Techniques Technical Evaluation | 2 | 2018 | 1 | 2021 |
| Deliveries: Threat Emulator / Simulator Delivery | 2 | 2018 | 1 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>3371 / *MAGTF EW Interoperability Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3371: *MAGTF EW Interoperability Development* | 1.617 | 1.609 | 0.371 | 1.291 | - | 1.291 | 1.196 | 1.002 | 1.027 | 1.047 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This project unit supports the United States Marine Corps air-ground interoperability by providing a variety of capabilities through multiple functions of the Software Reprogrammable Payload (SRP) when installed aboard SRP-capable aircraft. The spiral development plans allow adaptable, scalable, and open architecture philosophy to reduce stove-pipe solutions but enable future growth at a reduced operational and sustainment cost.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Software Reprogrammable Payload | 1.609 | 0.371 | 1.291 | 0.000 | 1.291 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue the development of the reduced form factor SRP for the identified platforms that can not support the Spiral 2 form factor and field evaluation of the Spiral 2. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue SRP support of a government-owned reference design for a flexible, in-operational reconfigurable software radio designed to meet current and future needs. Continue the development of the reduced form factor SRP for the identified platforms that can not support the Spiral 2 form factor and field evaluation of the Spiral 2. Support transition of Spiral 2 to Program of Record and Request for Proposal. Support the air-ground interoperability by providing a variety of capabilities through multiple functions of the Software Reprogrammable Payload when installed aboard SRP-capable aircraft. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $92K increase between FY 2019 and FY 2020 will fund integration issues associated with the additional waveforms into the SRP. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.609 | 0.371 | 1.291 | 0.000 | 1.291 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3371 / *MAGTF EW Interoperability Development* |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

This project unit is part of United States Marine Corps led efforts to ensure Marine Corps requirements are included in the budget process for the Future Year Defense Program and beyond. This effort is for the Software Reprogrammable Payload. This program is part of the Marine Corps initial steps to create a common interoperable system to distribute multiple data types across the battle-space through spiral development.

**E. Performance Metrics**

After successful completion of the Spiral 2 development and demonstration onboard MV-22 test platform support transition to Program of Record and support request for proposal package.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3371 / *MAGTF EW Interoperability Development* |

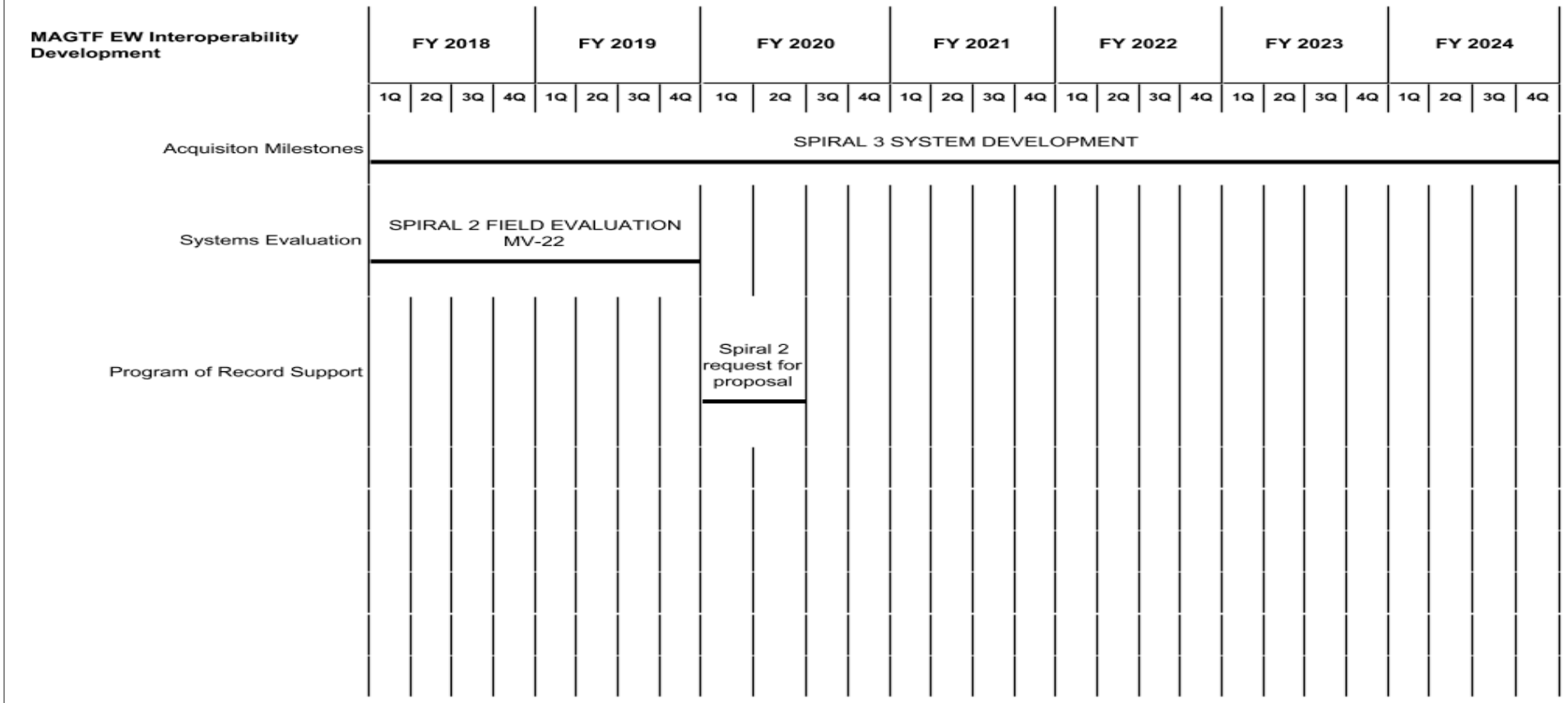
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.408 | 0.706 | Nov 2017 | 0.371 | Nov 2018 | 0.550 | Nov 2019 | - | | 0.550 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NRL : Washington, DC | 0.344 | 0.165 | Nov 2017 | 0.000 | | 0.221 | Dec 2019 | - | | 0.221 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | Assurance Technology Corp : Carlisle, MA | 0.665 | 0.489 | Dec 2017 | 0.000 | | 0.300 | Dec 2019 | - | | 0.300 | 0.000 | 1.454 | 1.454 |
| Systems Engineering | C/CPFF | DCS : Alexandria, VA | 0.200 | 0.249 | Dec 2017 | 0.000 | | 0.220 | Nov 2019 | - | | 0.220 | 0.000 | 0.669 | 0.669 |
| | | **Subtotal** | 1.617 | 1.609 | | 0.371 | | 1.291 | | - | | 1.291 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.617 | 1.609 | | 0.371 | | 1.291 | | - | | 1.291 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3371 / *MAGTF EW Interoperability Development* |




*2020DON - 0604270N - 3371*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>3371 / *MAGTF EW Interoperability Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***MAGTF EW Interoperability Development*** | | | | |
| Acquisiton Milestones: SPIRAL 3 SYSTEM DEVELOPMENT | 1 | 2018 | 4 | 2024 |
| Systems Evaluation: SPIRAL 2 FIELD EVALUATION MV-22 | 1 | 2018 | 4 | 2019 |
| Program of Record Support: Spiral 2 request for proposal | 1 | 2020 | 2 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 3.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

PU C327 was a new Congressional Add beginning in FY 2018.

**A. Mission Description and Budget Item Justification**

This Congressional Add project unit supports the United States Marine Corps (USMC) development, design, and manufacturing of the AN/ALQ-231(V)3 pod (Rotary-Wing variant) jettison capability on the UH-1Y platform. AN/ALQ-231 (V) 3 pod was originally developed as part of a Rapid Deployment Capability (RDC) program. UH-1Y jettison capability was not developed as part of the RDC program. This FY 2018 Congressional add will develop, integrate and test jettison capability that will be incorporated and integrated on all (V)3 pods.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Intrepid Tiger II (V)3 UH-1Y Jettison Capability | 3.000 | 0.000 |
| ***FY 2018 Accomplishments:*** New start Congressional Add efforts to design, develop, test, and manufacture AN/ALQ-231(V)3 pod (Rotary-Wing variant) jettison capability on the UH-1Y platform. | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 3.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

This Congressional Add project unit was included as part of USMC led efforts to ensure Marine Corps Intrepid Tiger II (V)3 jettison requirements are included on all pods.

**E. Performance Metrics**

Commencement of design, development, manufacturing and testing of Intrepid Tiger II (V)3 UH-1Y Jettison Capability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604270N / *Electronic Warfare (EW) Dev* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intrepid Tiger II (V)3 UH-1Y Jettison Capability Systems Engineering | PO | NAWCWD : Point Mugu, CA | 0.000 | 1.980 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.980 | - |
| | | **Subtotal** | 0.000 | 1.980 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.980 | N/A |

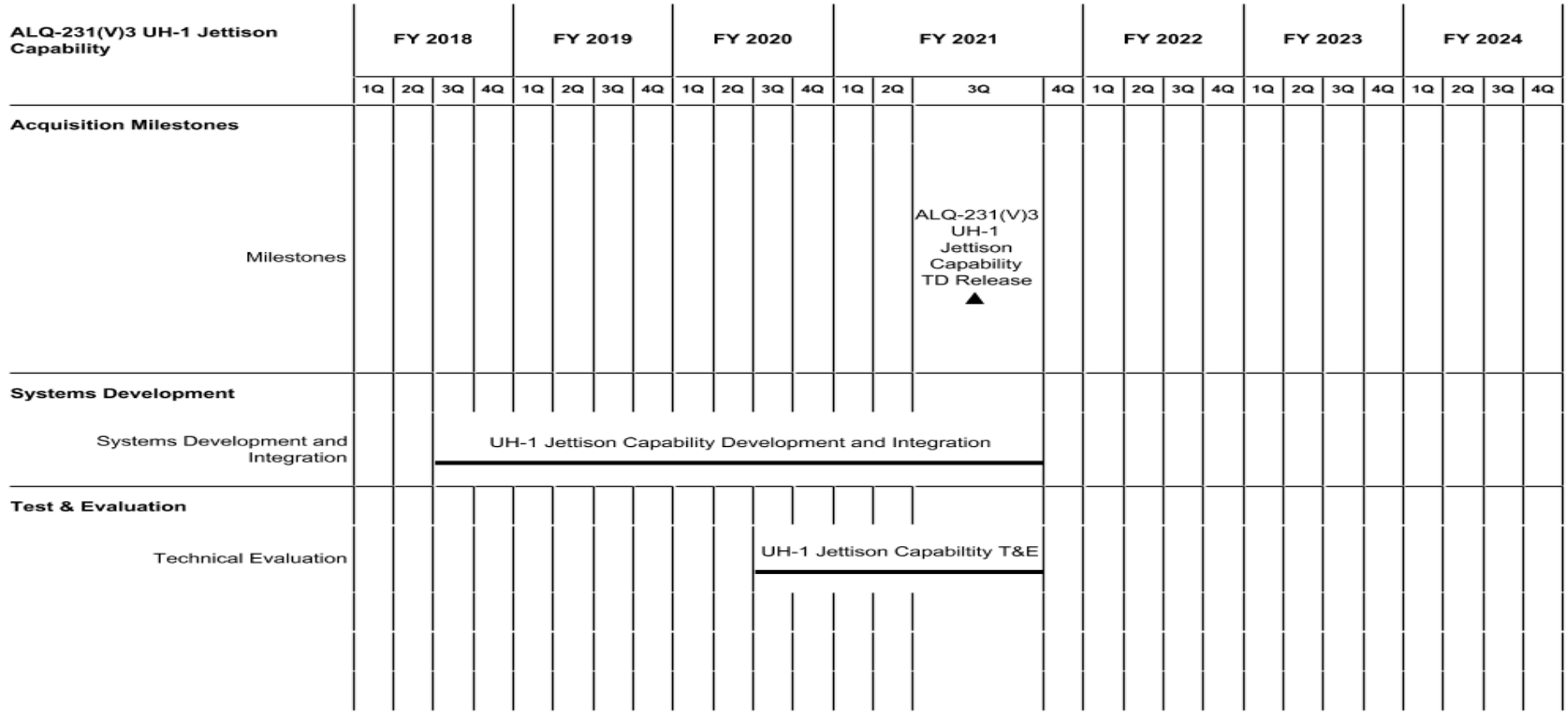
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intrepid Tiger II (V)3 UH-1Y Jettison Capability Test & Evaluation | PO | NAWCAD : Patuxent River, MD | 0.000 | 1.020 | Oct 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.020 | - |
| | | **Subtotal** | 0.000 | 1.020 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.020 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 3.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020DON - 0604270N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604270N / *Electronic Warfare (EW) Dev* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ALQ-231(V)3 UH-1 Jettison Capability*** | | | | |
| Acquisition Milestones: Milestones: ALQ-231(V)3 UH-1 Jettison Capability TD Release | 3 | 2021 | 3 | 2021 |
| Systems Development: Systems Development and Integration: UH-1 Jettison Capability Development and Integration | 3 | 2018 | 3 | 2021 |
| Test & Evaluation: Technical Evaluation: UH-1 Jettison Capabiltity T&E | 3 | 2020 | 3 | 2021 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604273M *I (U)Executive Helo Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 0.000 | 245.064 | 187.436 | - | 187.436 | 83.654 | 38.893 | 24.620 | 25.100 | Continuing | Continuing |
| 3300: *Presidential Helicopter VH-92A* | 0.000 | 0.000 | 245.064 | 164.985 | - | 164.985 | 59.697 | 14.512 | 0.000 | 0.000 | 0.000 | 484.258 |
| 3390: *VH-92A Improvements* | 0.000 | 0.000 | 0.000 | 22.451 | - | 22.451 | 23.957 | 24.381 | 24.620 | 25.100 | Continuing | Continuing |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 429 | | | | | | | | | | | | |

**Note**

In FY 2019 Project Unit 3300 transferred from Program Element 0604273N to Program Element 0604273M.

**A. Mission Description and Budget Item Justification**

The VH-92A is the replacement helicopter for the VH-3D and the VH-60N, the aircraft currently used by Marine Helicopter Squadron One (HMX-1) to transport the President, Vice President, and other distinguished officials as directed by the White House Military Office. The VH-3D and VH-60N are approaching the end of their service lives. Funding for the VH-92A program supports Engineering and Manufacturing Development Phase activities, including: integration of systems; production, qualification, and support of test articles; development of logistics products; and demonstration of system integration, interoperability, safety, and utility.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 245.064 | 187.670 | - | 187.670 |
| Current President's Budget | 0.000 | 245.064 | 187.436 | - | 187.436 |
| Total Adjustments | 0.000 | 0.000 | -0.234 | - | -0.234 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.234 | - | -0.234 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604273M *I (U)Executive Helo Development* |

**Change Summary Explanation**

In FY 2019 Project Unit 3300 transferred from Program Element 0604273N to Program Element 0604273M.

FY 2020 funding decreases for project 3300 Presidential Helicopter VH-92A from due to ramp down of the Engineering and Manufacturing Development Phase (EMD) efforts and the modifications of the Engineering Development Model and System Demonstration Test Article aircraft.

New project 3390 in FY 2020 to support the commencement of VH-92A product improvement efforts.

Technical: Not applicable.

Schedule:
1. Capabilities Development Document (CDD) - Per the VH-92A Milestone C Information/Documentation Plan received after PB19 VH-92A a CDD is required in lieu of a Capability Production Document (CPD) previously entered in PE 0604273N in FY 2018.

Systems Engineering: Not applicable.

Logistics: Not applicable.

Contracting: Not applicable.

Deliveries: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3300 / *Presidential Helicopter VH-92A* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3300: *Presidential Helicopter VH-92A* | 0.000 | 0.000 | 245.064 | 164.985 | - | 164.985 | 59.697 | 14.512 | 0.000 | 0.000 | 0.000 | 484.258 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 429

**Note**

Funding for Project Unit 3300 for FY 2019 transfers from Program Element 0604273N to Program Element 0604273M.

**A. Mission Description and Budget Item Justification**

Marine Helicopter Squadron One (HMX-1) is required to provide safe and timely transportation for the President and Vice President of the United States, heads of state and others as directed by the White House Military Office. Currently two Type, Model, Series aircraft are used by HMX-1 for the Presidential support mission - the VH-3D and the VH-60N. The VH-92A will replace the VH-3D and VH-60N. Funding supports Engineering and Manufacturing Development Phase (EMD) activities including integration of systems, production, qualification, and support of test articles, logistics products development, demonstration of system integration, interoperability, safety and utility. Two Engineering Development Model (EDM) and four System Demonstration Test Article (SDTA) aircraft will be delivered during EMD. The EDM and SDTA aircraft will be used for Developmental Test & Evaluation (DT&E), Operational Testing (OT) for verification of Performance Based Specifications (PBS), airworthiness certification and Supportability Verification. The EDM aircraft will remain test aircraft for the life of the program. The SDTA aircraft will be used for Initial Operational Test and Evaluation (IOT&E) and will be refurbished for Initial Operational Capability (IOC).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 0.000 | 203.796 | 136.994 | 0.000 | 136.994 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue engineering support for Mission Communications System (MCS) and hardware/software maturation. Deliver second EDM and first three SDTA aircraft and continue modification of remaining SDTA aircraft to the VH-92A configuration. Continue Contractor Logistics Support (CLS) at Presidential Helicopters Support Facility (PHSF) Patuxent River, MD to support government led Integrated Test. Continue providing Government Furnished Equipment (GFE) to prime contractor. Continue engineering support, redesign and modify first EDM aircraft for the Forward Air Stair door and the Fifth Multi-Function Display (MFD). Continue Broad Agency Announcement efforts for future communications capabilities. Execute EMD Phase activities, including: | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| integration of systems; production, qualification, and support of test articles; development of logistics products; and demonstration of system integration, interoperability, safety, and utility.<br><br>***FY 2020 Base Plans:***<br>Continue engineering support for MCS and hardware/software maturation. Deliver final SDTA aircraft, conduct Initial Operational Test & Evaluation (IOT&E) and attain Initial Operational Capability (IOC). Continue Contractor Logistics Support (CLS) at PHSF Patuxent River, MD. Continue engineering support and modify second EDM and SDTA aircraft for the Forward Airstair door and the MFD. Execute EMD Phase activities, including: integration of systems; production, qualification, and support of test articles; development and evaluation of logistics products; and demonstration of system integration, interoperability, safety, and utility.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decreases from FY 2019 to FY 2020 due to the EMD efforts ramping down. | | | | | |
| ***Title:*** Support | 0.000 | 15.336 | 8.504 | 0.000 | 8.504 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue support of Aviation Logistics Environment (ALE) product standup in order to support Government Led Integrated Test. Continue preparation of Milestone C supportability products. Continue to support procurement and delivery of Common Support Equipment (CSE). Continue procurement of support equipment (SE) products. Perform SE evaluations. Continue the development and generation of task analyses and maintenance summaries. Continue Level of Repair Analyses and implementation of I-level test and check capability and repair capability. Continue Interactive Electronic Technical Manual (IETM) development/verification. Perform supportability test and evaluation, to include maintenance demonstrations. Support programmatic and technical reviews.<br><br>***FY 2020 Base Plans:***<br>Continue to support procurement and delivery of CSE. Perform SE evaluations. Continue the development and generation of task analyses and maintenance summaries. Continue Level of Repair Analyses and implementation of I-level test and check capability and repair capability. Continue all IETM development/ | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| verification and perform updates. Perform supportability test and evaluation, to include maintenance demonstrations. Support programmatic and technical reviews.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decreases from FY 2019 to FY 2020 due to the EMD efforts ramping down. | | | | | |
| ***Title:*** Test and Evaluation | 0.000 | 19.437 | 15.328 | 0.000 | 15.328 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue Government Integrated testing, cyber-testing and evaluation, Performance Based Specifications (PBS) compliance verification, support equipment evaluations/assessments, instrumentation development/ support and Integrated Test support at the Presidential Helicopter Support Facility (PHSF). Conduct Operational Assessment Maturity Review (OAMR) and prepare for Operational Assessment (OA). Produce test reports (Integrated Test, Operational Test, Interim LFT&E) to support IOT&E. Conduct OA and training of Operational Test Team personnel in preparation for IOT&E. Continue to mature Systems Integration Laboratory (SIL) and conduct software/hardware regression testing and validation/verification. Initiate planning for Follow-On Test and Evaluation (FOT&E) to include shipboard compatibility testing and evaluation of continued development of the VH-92A System. Produce test reports (Integrated Test and LFT&E) to support Milestone C.<br>***FY 2020 Base Plans:***<br>Complete Government Integrated testing, PBS compliance verification, support equipment evaluations/ assessments and instrumentation development/support and Integrated Test support at the PHSF. Continue cyber-testing and evaluation. Conduct Operational Test Readiness Review (OTRR) in preparation of Initial Operational Test & Evaluation (IOT&E) and produce test reports. Continue to mature SIL and conduct software/ hardware regression testing and validation/verification. Commence Follow-On Test and Evaluation (FOT&E) to include shipboard compatibility testing and evaluation of continued development of the VH-92A System.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Funding decreases from FY 2019 to FY 2020 due to the EMD efforts ramping down. | | | | | |
| ***Title:*** Program Management | 0.000 | 6.495 | 4.159 | 0.000 | 4.159 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Perform project management tasks to support Milestone C preparation, technical reviews, risk-reduction activities, contractor deliverables, configuration management, training, physical security, and information assurance/cyber security. Perform planned Schedule Risk Assessment (SRA) and Estimate at Completion (EAC) update. Conduct Milestone C and exercise LRIP I option. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue to perform project management tasks, technical reviews, risk-reduction activities, contractor deliverables, configuration management, training, physical security, and information assurance/cyber security. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decreases from FY 2019 to FY 2020 due to EMD efforts ramping down. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 245.064 | 164.985 | 0.000 | 164.985 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN-4/04550: *VH-92A Executive Helo* | 0.000 | 649.015 | 658.067 | - | 658.067 | 712.993 | 0.000 | 0.000 | 0.000 | 0.000 | 2,020.075 |
| • RDTEN/0604273N: *Executive Helo Development* | 430.647 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,899.998 |
| • APN-6/0605: *Spares and Repair Parts* | 0.000 | 80.939 | 87.983 | - | 87.983 | 73.907 | 0.000 | 0.000 | 0.000 | 0.000 | 242.829 |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

**D. Acquisition Strategy**

The VH-92A program is integrating mature subsystems into an existing commercial helicopter under a Fixed Price Incentive Firm (FPIF) contract. The program is procuring two (2) Engineering Development Model aircraft, four (4) System Demonstration Test Article aircraft, twelve (12) Low Rate Initial Production aircraft and five (5) Full Rate Production aircraft.

**E. Performance Metrics**

Program performance metrics are contained in the Acquisition Program Baseline (APB) that was approved by the Milestone Decision Authority (USD(AT&L)) on 17 Apr 2014. The program's Milestone (MS) B Acquisition Decision Memorandum was signed on 17 Apr 2014. The VH-92A contract for the Engineering and Manufacturing Development phase and priced options for production was awarded on 7 May 2014. The VH-92A Program successfully completed the System Preliminary Design Review on 21 August 2015. The program successfully completed the Critical Design Review (CDR) in FY 2016. The VH-92A Program successfully completed the Test Readiness Review and the Flight Readiness Review in FY 2018. Milestone C approval is anticipated 3Q FY 2019.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3300 / *Presidential Helicopter VH-92A* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Dev - VH-92A EMD Contracts | C/FPIF | Sikorsky Aircraft Corporation : Stratford, CT | 0.000 | 0.000 | | 149.925 | Oct 2018 | 82.936 | Oct 2019 | - | | 82.936 | 49.419 | 282.280 | 282.280 |
| Primary HW Dev - Advanced Capabilities | Various | NSMA : Arlington, VA | 0.000 | 0.000 | | 8.310 | Feb 2019 | 3.181 | Feb 2020 | - | | 3.181 | 3.000 | 14.491 | - |
| Primary HW Dev - VH-92A MCS Design | WR | NAWCAD : St. Inigoes, MD | 0.000 | 0.000 | | 5.713 | Nov 2018 | 2.120 | Nov 2019 | - | | 2.120 | 0.028 | 7.861 | - |
| Primary HW Dev - VH-92A GFE | Various | Various : Various | 0.000 | 0.000 | | 4.050 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.050 | - |
| Primary HW Dev - VH92A MFD/Forward Air Stair Door | C/UCA | Sikorsky Aircraft Corporation : Stratford, CT | 0.000 | 0.000 | | 23.000 | Mar 2019 | 28.000 | Mar 2020 | - | | 28.000 | 0.000 | 51.000 | 51.000 |
| Systems Engineering | Various | Various : Various | 0.000 | 0.000 | | 0.713 | Nov 2018 | 0.600 | Nov 2019 | - | | 0.600 | 0.200 | 1.513 | - |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 6.137 | Nov 2018 | 2.508 | Nov 2019 | - | | 2.508 | 1.571 | 10.216 | - |
| Systems Engineering | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 2.600 | Dec 2018 | 1.723 | Dec 2019 | - | | 1.723 | 0.997 | 5.320 | - |
| Training | WR | NAWCTSD : Orlando, FL | 0.000 | 0.000 | | 1.804 | Nov 2018 | 1.384 | Nov 2019 | - | | 1.384 | 0.800 | 3.988 | - |
| Training | C/FPIF | Sikorsky Aircraft Corporation : Stratford, CT | 0.000 | 0.000 | | 0.000 | | 13.020 | Mar 2020 | - | | 13.020 | 0.000 | 13.020 | 13.020 |
| Training | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 1.408 | Dec 2018 | 1.500 | Dec 2019 | - | | 1.500 | 1.122 | 4.030 | - |
| Training | Various | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.136 | Nov 2018 | 0.022 | Nov 2019 | - | | 0.022 | 0.000 | 0.158 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 203.796 | | 136.994 | | - | | 136.994 | 57.137 | 397.927 | N/A |

**Remarks**

FUNDING PROFILE: The Target Value of the Primary Hardware Development EMD Contract reflects the total value of the EMD contracts for PE 0604273M. The total value of the EMD contract is $1,563.644 million to include $1,281.364 million funded by PE 0604273N.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Dev - (C/UCA)- One undefinitized contract action for the incorporation of Fifth Multi-Functional Display (MFD) and Forward Airstair Door changes. The Forward Airstair Door requires redesign to raise the outboard edge of the door to a position equal to or above the aircraft door frame opening when fully open to ensure the door is at or above the Water Line (WL) 256 when fully opened. The VH-92A cockpit instrument panel requires design changes and the addition of an MFD and removal of the existing tactical display. The Fifth MFD is identical to the four existing MFD's and will increase pilot situational awareness. | | | | | | | | | | | | | | | |
| Systems Engineering (Various) - Support contract for cyber security improvements. | | | | | | | | | | | | | | | |
| Systems Engineering (NAWCAD Patuxent River) - Engineering support for hardware maturation, Reliability and Maintainability (R&M) analysis and Software Support Activity. | | | | | | | | | | | | | | | |
| Systems Engineering (NAVAIR Patuxent River) - Engineering Support Contracts to be funded at NAVAIR Headquarters. | | | | | | | | | | | | | | | |
| Training (C/FPIF) - Contract action was added for upgrades and correction deficiencies for the Maintenance Training Device (MTD), Simulation Emulation Maintenance Trainer (SEMT), Courseware 2.0, Flight Training Device (FTD) and Pilot Procedures Trainer. Efforts are to commence after Cadre training concludes in 4Q FY 2019. | | | | | | | | | | | | | | | |
| Training (NAVAIR Patuxent River) - Training Product Development contracts to be funded at NAVAIR Headquarters. | | | | | | | | | | | | | | | |

FINANCIAL PERFORMANCE: The VH-92A EMD is a Fixed Price Incentive Firm contract with Performance Based Payments. The VH-92A program will lag OSD traditional expenditure benchmarks. The program must obligate 100 percent of the funding required by the contractor for incurred costs, termination liability, and profit. However, the program is limited to paying the contractor only 90 percent of the performance based costs and profit. Mandatory funding obligations and payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

ACRONYMS:
EMD = Engineering & Manufacturing Development
MCS = Mission Communications System
GFE = Government Furnished Equipment
MFD = Multi-Function Display

Notes:
The decrease in FY 2019 Primary HW Development for the VH-92A EMD Contract is due to the increase in funding in FY 2018 (0604273N) for this effort to better align the funding with the planned work.
The increase in FY 2019 funding for the Primary HW Dev VH-92A MFD/Forward Air Stair Door which is being awarded on an Undefinitized Contract Action (UCA) with the Prime contractor is based on updated estimates and schedules, funds were rephrased to better align to efforts. FY 2018 funding in PE 0604273N was rephased as a result of these changes.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 4.540 | Nov 2018 | 3.104 | Nov 2019 | - | | 3.104 | 2.132 | 9.776 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3300 / *Presidential Helicopter VH-92A* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | FRC : Cherry Point, NC | 0.000 | 0.000 | | 5.087 | Nov 2018 | 3.091 | Nov 2019 | - | | 3.091 | 0.031 | 8.209 | - |
| Integrated Logistics Support | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 0.875 | Nov 2018 | 0.350 | Nov 2019 | - | | 0.350 | 0.178 | 1.403 | - |
| Integrated Logistics Support | WR | SPAWAR : San Diego, CA | 0.000 | 0.000 | | 0.375 | Nov 2018 | 0.191 | Nov 2019 | - | | 0.191 | 0.000 | 0.566 | - |
| Integrated Logistics Support | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 3.959 | Sep 2019 | 1.618 | Sep 2020 | - | | 1.618 | 2.161 | 7.738 | - |
| Integrated Logistics Support | Various | Various : Various | 0.000 | 0.000 | | 0.500 | Nov 2018 | 0.150 | Nov 2019 | - | | 0.150 | 0.000 | 0.650 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 15.336 | | 8.504 | | - | | 8.504 | 4.502 | 28.342 | N/A |

**Remarks**

FUNDING PROFILE:
Integrated Logistics Support (ILS) (NAWCAD Patuxent River) - ILS acquisition and management of the VH-92A aircraft. Evaluate contractor performance of Supportability Test & Evaluation, Intermediate & Depot level repair capability development.
ILS (FRC Cherry Point) - VH-92A maintenance planning, reliability centered maintenance (RCM), logistics support analysis efforts, level of repair analysis and Technical Publications development.
ILS (NAWCAD Lakehurst) - SE planning and analysis, development of support equipment, development of requirements data (SERDs), SE analysis of I&D level capabilities and logistics support products for SE and SE test and evaluation. Funds previously planned in the Integrated Logistics Support- CSE line in President's Budget FY 2018 has been moved to this line due to updated procurement strategies.
ILS (SPAWAR San Diego) - Software integration to include certification and accreditation of the VH-92A ALE.
ILS (NAVAIR Patuxent River) - Contractor support of ILS efforts, Supportability Test & Evaluation, Intermediate & Depot level repair capability development.
ILS (Various) - Funding for various activities in support of Support Equipment (SE) Calibration and development and updates to the NAVAIR Standard IETM Viewer (NSIV) software

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 8.822 | Nov 2018 | 7.756 | Nov 2019 | - | | 7.756 | 0.000 | 16.578 | - |
| Developmental Test & Evaluation | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.014 | Nov 2018 | 0.014 | Nov 2019 | - | | 0.014 | 0.000 | 0.028 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3300 / *Presidential Helicopter VH-92A* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | MIPR | JITC : Ft. Huachuca, AZ | 0.000 | 0.000 | | 0.029 | Oct 2018 | 0.036 | Oct 2019 | - | | 0.036 | 0.000 | 0.065 | - |
| Developmental Test & Evaluation | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 5.671 | Dec 2018 | 5.592 | Dec 2019 | - | | 5.592 | 0.000 | 11.263 | - |
| Live Fire Test & Evaluation | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 1.592 | Nov 2018 | 0.662 | Nov 2019 | - | | 0.662 | 0.000 | 2.254 | - |
| Operational Test & Evaluation | WR | COTF : Norfolk, VA | 0.000 | 0.000 | | 1.259 | May 2019 | 1.268 | May 2020 | - | | 1.268 | 0.000 | 2.527 | - |
| Integrated Test & Evaluation | C/FFP | Petroleum Helicopters International, Inc : Lafayette, LA | 0.000 | 0.000 | | 2.050 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.050 | 2.050 |
| Follow-On Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 5.162 | 5.162 | - |
| Follow-On Test & Evaluation | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 2.192 | 2.192 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 19.437 | | 15.328 | | - | | 15.328 | 7.354 | 42.119 | N/A |

**Remarks**

Development Test & Evaluation (DT&E) (NAWCAD Patuxent River) - Support for developmental test & evaluation, contractor test (CT), government led Integrated Test, Operational Assessment (OA), system integration lab, T&E instrumentation design, procurement, calibration, and tooling.
DT&E (NAWCWD Point Mugu) - Cyber Security T&E.
DT&E (JITC) - Joint Interoperability Test Certification.
DT&E (NAVAIR Patuxent River) - Movement of Test and Evaluation Support Contracts and test asset maintenance support contracts to be funded at NAVAIR Headquarters.
Live Fire Test & Evaluation (NAWCWD China Lake) - LFT&E test planning, documentation, execution and reporting.
Operational Test & Evaluation (COTF) - Technical and engineering support in support of Operational Test and Integrated Test and evaluation of the VH-92A aircraft. Support efforts include documentation review, test planning, operational test design, test analysis and reporting and test operations.
Integrated Test & Evaluation (Petroleum Helicopters International, Inc Lafayette, LA) - Lease of a training asset in support of test pilot proficiency training. The total value of the contract is $6.964 to include $4.914 funded by PE 0604273N.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 2.771 | Nov 2018 | 1.997 | Nov 2019 | - | | 1.997 | 3.311 | 8.079 | - |
| Program Management Support | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 3.624 | Dec 2018 | 2.062 | Dec 2019 | - | | 2.062 | 1.756 | 7.442 | - |
| Transportation | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.025 | Oct 2018 | 0.025 | Oct 2019 | - | | 0.025 | 0.000 | 0.050 | - |
| Travel | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.075 | Oct 2018 | 0.075 | Oct 2019 | - | | 0.075 | 0.150 | 0.300 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 6.495 | | 4.159 | | - | | 4.159 | 5.217 | 15.871 | N/A |

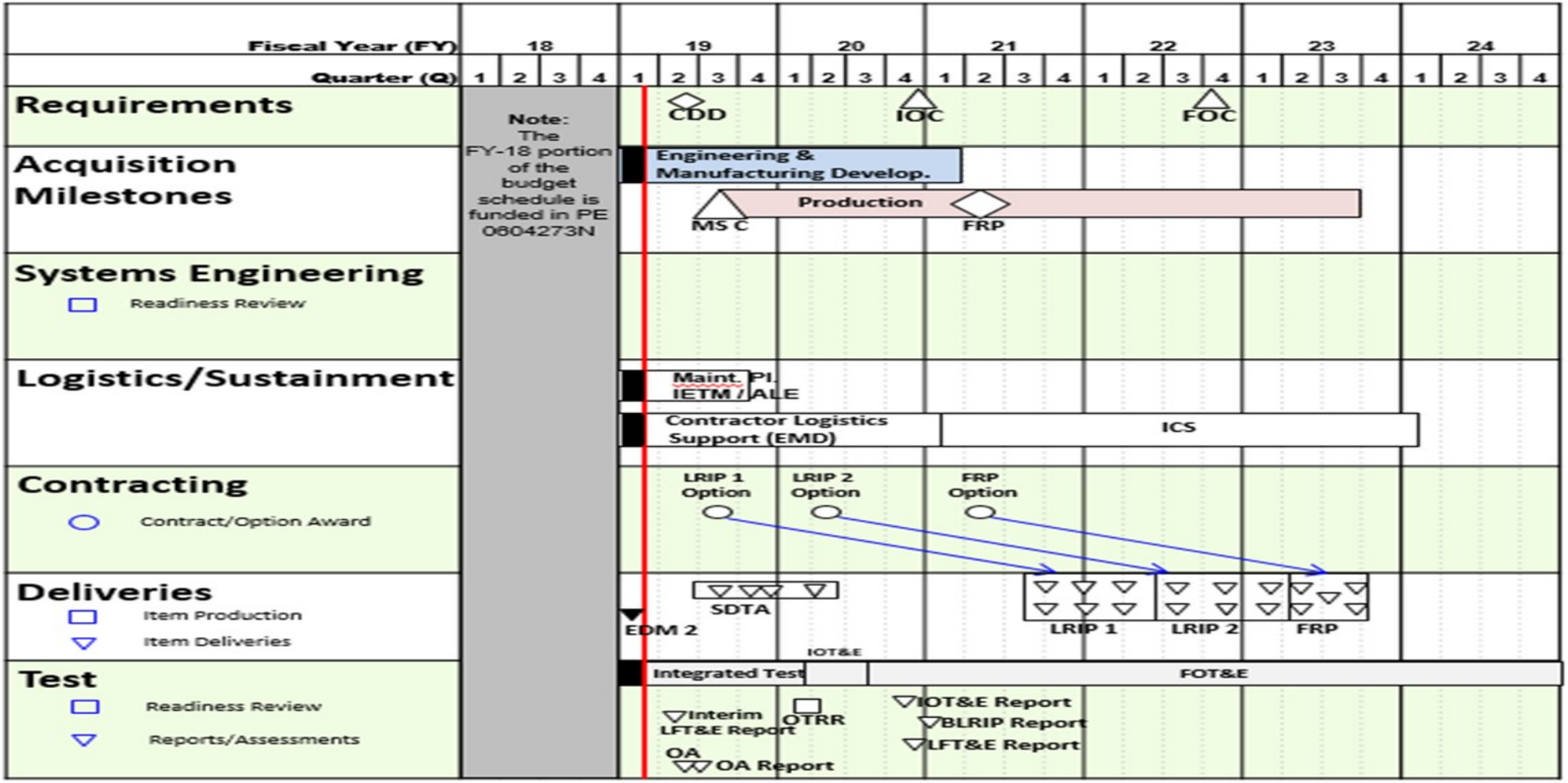
**Remarks**

Program Management Support - Project Management support for Milestone C preparation, technical reviews, risk reduction activities, contractor deliverables, configuration management, physical security, training and information assurance/cyber security.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 245.064 | | 164.985 | | - | | 164.985 | 74.210 | 484.259 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Presidential Helicopter VH-92A*** | | | | |
| Requirements: Capabilities Development Document (CDD) | 2 | 2019 | 2 | 2019 |
| Requirements: Initial Operational Capability | 4 | 2020 | 4 | 2020 |
| Requirements: Full Operational Capability | 4 | 2022 | 4 | 2022 |
| Acquisition Milestones: Engineering & Manufacturing Development | 1 | 2019 | 1 | 2021 |
| Acquisition Milestones: Production | 3 | 2019 | 3 | 2023 |
| Acquisition Milestones: Milestone C | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: Full Rate Production Decision | 2 | 2021 | 2 | 2021 |
| Logistics/Sustainment: Maintenance Planning / IETM / ALE | 1 | 2019 | 4 | 2019 |
| Logistics/Sustainment: Contractor Logistics Support (EMD) | 1 | 2019 | 1 | 2021 |
| Logistics/Sustainment: Interim Contractor Support | 1 | 2021 | 1 | 2024 |
| Contracting: Low Rate Initial Production (LRIP) Lot 1 (APN) | 3 | 2019 | 3 | 2019 |
| Contracting: LRIP - Lot 2 (APN) | 2 | 2020 | 2 | 2020 |
| Contracting: FRP (APN) | 2 | 2021 | 2 | 2021 |
| Deliveries: Engineering Development Model (EDM) 2 | 1 | 2019 | 1 | 2019 |
| Deliveries: System Demonstration Test Article (SDTA) Aircraft 1 | 3 | 2019 | 3 | 2019 |
| Deliveries: SDTA Aircraft 2 | 4 | 2019 | 4 | 2019 |
| Deliveries: SDTA Aircraft 3 | 4 | 2019 | 4 | 2019 |
| Deliveries: SDTA Aircraft 4 | 2 | 2020 | 2 | 2020 |
| Deliveries: LRIP - Lot 1 (APN) | 3 | 2021 | 2 | 2022 |
| Deliveries: LRIP - Lot 2 (APN) | 2 | 2022 | 1 | 2023 |
| Deliveries: Full Rate Production (APN) | 2 | 2023 | 3 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test: Developmental Test - Integrated Test | 1 | 2019 | 1 | 2020 |
| Test: Operational Assessment | 2 | 2019 | 2 | 2019 |
| Test: Interim Live Fire Test & Evaluation Report | 2 | 2019 | 2 | 2019 |
| Test: Operational Assessment Report | 3 | 2019 | 3 | 2019 |
| Test: Operational Test Readiness Review | 1 | 2020 | 1 | 2020 |
| Test: Initial Operational Test & Evaluation | 1 | 2020 | 3 | 2020 |
| Test: Follow-on Test & Evaluation | 3 | 2020 | 4 | 2024 |
| Test: Live Fire Test & Evaluation Report | 4 | 2020 | 4 | 2020 |
| Test: Initial Operational Test & Evaluation Report | 4 | 2020 | 4 | 2020 |
| Test: Beyond Low Rate Initial Production Report | 1 | 2021 | 1 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3390 / *VH-92A Improvements* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3390: *VH-92A Improvements* | 0.000 | 0.000 | 0.000 | 22.451 | - | 22.451 | 23.957 | 24.381 | 24.620 | 25.100 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 429

**Note**

This project is a new start in FY2020.

**A. Mission Description and Budget Item Justification**

VH-92A Product Improvements address pre-planned product improvement requirements written into the Capabilities Development Document approved by Joint Requirements Oversight Committee in Jan 2013 and updated for Milestone C. The VH-92A Improvement projects provide near and long term improvements to the fleet, focusing on documented deficiencies related to mission systems, maintainability and reliability and obsolescence issues. The project addresses development associated with Mission Communications System (MCS) upgrades (both software and hardware), enhancements to Wideband Line of Sight (WBLOS), enhanced visual system (EVS), and cockpit upgrades.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Improvement Development | 0.000 | 0.000 | 16.298 | 0.000 | 16.298 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>Develop pre-planned product improvements for incremental incorporation to the VH-92A capability baseline to include Enhancements to WBLOS, EVS, cockpit upgrades, shipboard interoperability and MCS hardware and software upgrades. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in FY2020 due to the commencement of the VH-92A Improvements. | | | | | |
| ***Title:*** Test and Evaluation | 0.000 | 0.000 | 4.850 | 0.000 | 4.850 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3390 / *VH-92A Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Conduct follow on Test and Evaluation (T&E) for Mission Communications System (MCS) upgrades (both software and hardware), enhancements to Wideband Line of Sight (WBLOS), enhanced visual system (EVS), cockpit upgrades, Shipboard interoperability and maintain test aircraft.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in FY2020 due to the commencement of the VH-92A Improvements. | | | | | |
| ***Title:*** Program Management<br>***Articles:***<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Conduct technical, cost, risk, and logistics analysis of preplanned product improvements. Evaluate system requirements through cost/performance trade-off analysis. Provide technical and management support for the development of acquisition<br>documentation. Provide management of technical development efforts.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY2020 increases due to the commencement of the VH-92A Improvements. | 0.000<br>- | 0.000<br>- | 1.303<br>- | 0.000<br>- | 1.303<br>- |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 22.451 | 0.000 | 22.451 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3390 / *VH-92A Improvements* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN-4/04550: *VH-92A Executive Helo* | 0.000 | 649.015 | 658.067 | - | 658.067 | 712.993 | 0.000 | 0.000 | 0.000 | 0.000 | 2,020.075 |
| • APN-6/0605: *Spares and Repair Parts* | 0.000 | 80.939 | 87.983 | - | 87.983 | 73.907 | 0.000 | 0.000 | 0.000 | 0.000 | 242.829 |
| • RDTEN/0604273N: *Executive Helo Development* | 425.947 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,895.298 |

**Remarks**

**D. Acquisition Strategy**

VH-92A Product Improvements will include trade studies, cost-benefit analyses, and risk-reduction efforts to address improvements for aircraft capability, safety, operational weight, mission availability, component reliability, maintainability, software, and obsolescence.

**E. Performance Metrics**

Completion of required VH-92A Product Improvements efforts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3390 / *VH-92A Improvements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | C/CPIF | Sikorsky Aircraft Corporation : Stratford, CT | 0.000 | 0.000 | | 0.000 | | 5.761 | Nov 2019 | - | | 5.761 | Continuing | Continuing | Continuing |
| Product Development | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.593 | Nov 2019 | - | | 0.593 | Continuing | Continuing | Continuing |
| Product Development - Advanced Capabilities | Various | NSMA : Arlington, VA | 0.000 | 0.000 | | 0.000 | | 4.041 | Feb 2020 | - | | 4.041 | Continuing | Continuing | Continuing |
| Product Development - MCS | WR | NAWCAD : St. Inigoes, MD | 0.000 | 0.000 | | 0.000 | | 1.500 | Nov 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| Systems Engineering | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 3.552 | Nov 2019 | - | | 3.552 | Continuing | Continuing | Continuing |
| Training | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.851 | Nov 2019 | - | | 0.851 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 16.298 | | - | | 16.298 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Follow-On Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.808 | Apr 2020 | - | | 0.808 | Continuing | Continuing | Continuing |
| Follow-On Test & Evaluation | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 4.042 | Apr 2020 | - | | 4.042 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 4.850 | | - | | 4.850 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.898 | Nov 2019 | - | | 0.898 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273M / *(U)Executive Helo Development* | Project (Number/Name)<br>3390 / *VH-92A Improvements* | |

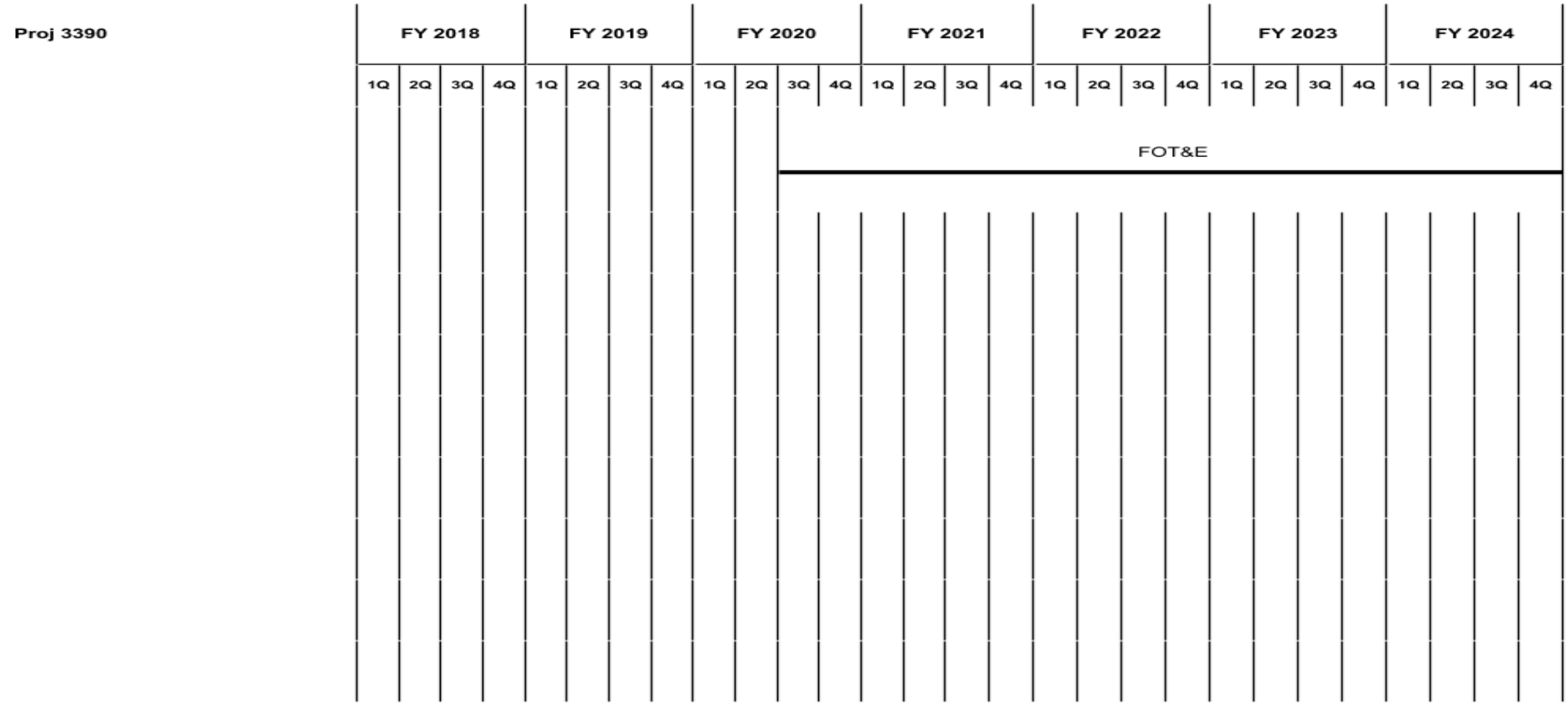
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.395 | Nov 2019 | - | | 0.395 | Continuing | Continuing | Continuing |
| Travel | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.010 | Nov 2019 | - | | 0.010 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.303 | | - | | 1.303 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 22.451 | | - | | 22.451 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3390 / *VH-92A Improvements* |




*2020OSD - 0604273M - 3390*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273M / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3390 / *VH-92A Improvements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3390*** | | | | |
| Follow-On Test & Evaluation | 3 | 2020 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604273N *I (U)Executive Helo Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,469.351 | 430.647 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,899.998 |
| 3300: *Presidential Helicopter VH-92A* | 1,469.351 | 430.647 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,899.998 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 429 | | | | | | | | | | | | |

**Note**

In FY 2019 Project Unit 3300 transferred from Program Element 0604273N to Program Element 0604273M.

**A. Mission Description and Budget Item Justification**

The VH-92A is the replacement helicopter for the VH-3D and the VH-60N, the aircraft currently used by Marine Helicopter Squadron One (HMX-1) to transport the President, Vice President, and other distinguished officials as directed by the White House Military Office. The VH-3D and VH-60N are approaching the end of their service lives. Funding for the VH-92A program supports Engineering and Manufacturing Development Phase activities, including: integration of systems; production, qualification, and support of test articles; development of logistics products; and demonstration of system integration, interoperability, safety, and utility.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 451.938 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 430.647 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -21.291 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -14.291 | 0.000 | | | |
| • Congressional Directed Reductions | -7.000 | - | - | - | - |
| Adjustments | | | | | |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604273N *I (U)Executive Helo Development* |

**Change Summary Explanation**

In FY 2019 Project Unit 3300 transferred from Program Element 0604273N to Program Element 0604273M.

Technical: Not applicable.

Schedule: Not applicable.

Systems Engineering: Not applicable.

Logistics: Not applicable.

Contracting: Not applicable.

Deliveries: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604273N / *(U)Executive Helo Development* | | | | Project (Number/Name)<br>3300 / *Presidential Helicopter VH-92A* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3300: *Presidential Helicopter VH-92A* | 1,469.351 | 430.647 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,899.998 |
| Quantity of RDT&E Articles | 6 | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 429

**Note**

Funding for Project Unit 3300 for FY 2019 through Cost to Complete has been realigned from PE 0604273N to Program Element 0604273M.

**A. Mission Description and Budget Item Justification**

Marine Helicopter Squadron One (HMX-1) is required to provide safe and timely transportation for the President and Vice President of the United States, heads of state and others as directed by the White House Military Office. Currently two Type, Model, Series aircraft are used by HMX-1 for the Presidential support mission - the VH-3D and the VH-60N. The VH-92A will replace the VH-3D and VH-60N. Funding supports Engineering and Manufacturing Development Phase (EMD) activities including integration of systems, production, qualification, and support of test articles, logistics products development, demonstration of system integration, interoperability, safety and utility. Two Engineering Development Model (EDM) and four System Demonstration Test Article (SDTA) aircraft will be delivered during EMD. The EDM and SDTA aircraft will be used for Developmental Test & Evaluation (DT&E), Operational Testing (OT) for verification of Performance Based Specifications (PBS), airworthiness certification and Supportability Verification. The EDM aircraft will remain test aircraft for the life of the program. The SDTA aircraft will be used for Initial Operational Test and Evaluation (IOT&E) and will be refurbished for Initial Operational Capability (IOC).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 376.596 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 Product Development efforts are funded in PE 0604273M. | | | | | |
| ***FY 2020 Base Plans:***<br>FY 2020 Product Development efforts are funded in PE 0604273M. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Support | 28.006 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY 2019 Support efforts are funded in PE 0604273M.<br>***FY 2020 Base Plans:***<br>FY 2020 Support efforts are funded in PE 0604273M.<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation | 19.670 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 Test and Evaluation efforts are funded in PE 0604273M.<br>***FY 2020 Base Plans:***<br>FY 2020 Test and Evaluation efforts are funded in PE 0604273M.<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Program Management | 6.375 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 Program Management efforts are funded in PE 0604273M.<br>***FY 2020 Base Plans:***<br>FY 2020 Program Management efforts are funded in PE 0604273M.<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 430.647 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN-4/04550: *VH-92A Executive Helo* | 0.000 | 649.015 | 658.067 | - | 658.067 | 712.993 | 0.000 | 0.000 | 0.000 | 0.000 | 2,020.075 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN-6/0605: *Spares and Repair Parts* | 0.000 | 80.939 | 87.983 | - | 87.983 | 73.907 | 0.000 | 0.000 | 0.000 | 0.000 | 242.829 |
| • RDTEN/0604273M: *Executive Helo Development* | 0.000 | 245.064 | 187.436 | - | 187.436 | 83.654 | 38.893 | 24.620 | 25.100 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The VH-92A program is integrating mature subsystems into an existing commercial helicopter under a Fixed Price Incentive Firm (FPIF) contract. The program is procuring two (2) Engineering Development Model aircraft, four (4) System Demonstration Test Article aircraft, twelve (12) Low Rate Initial Production aircraft and five (5) Full Rate Production aircraft.

**E. Performance Metrics**

Program performance metrics are contained in the Acquisition Program Baseline (APB) that was approved by the Milestone Decision Authority (USD(AT&L)) on 17 Apr 2014. The program's Milestone (MS) B Acquisition Decision Memorandum was signed on 17 Apr 2014. The VH-92A contract for the Engineering and Manufacturing Development phase and priced options for production was awarded on 7 May 2014. The VH-92A Program successfully completed the System Preliminary Design Review on 21 August 2015. The program conducted the Critical Design Review (CDR) in FY 2016. The program conducted the TRR/FRR in FY 2018. Milestone C approval is anticipated 3Q FY 2019.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Dev - VH-92A EMD Contract | C/FPIF | Sikorsky Aircraft Corporation : Stratford, CT | 973.787 | 307.577 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,281.364 | 1,281.364 |
| Primary HW Dev - Advanced Capabilities | Various | NSMA : Arlington, VA | 119.826 | 25.431 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 145.257 | - |
| Primary HW Dev - VH-92A MCS Design | WR | NAWCAD : St. Inigoes, MD | 60.900 | 6.811 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 67.711 | - |
| Primary HW Dev - VH-92A GFE | Various | Various : Various | 8.970 | 9.429 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 18.399 | - |
| Primary HW Dev - VH-92A MFD/Forward Air Stair Door | C/UCA | Sikorsky Aircraft Corporation : Stratford, CT | 0.000 | 6.000 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.000 | - |
| Systems Engineering | Various | Various : Various | 0.000 | 4.055 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.055 | - |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 78.769 | 7.107 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 85.876 | - |
| Systems Engineering | Various | NAVAIR : Patuxent River, MD | 0.000 | 5.750 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.750 | - |
| Training | WR | NAWCTSD : Orlando, FL | 5.727 | 1.791 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.518 | - |
| Training | Various | NAVAIR : Patuxent River, MD | 0.000 | 2.645 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.645 | - |
| Prior year Hdw Dev cost no longer funded in the FYDP | Various | Various : Various | 25.119 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.119 | - |
| | | **Subtotal** | 1,273.098 | 376.596 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,649.694 | N/A |

**Remarks**

FUNDING PROFILE: The Target Value of the Primary Hardware Development EMD Contract reflects the total value of the EMD contract for PE 0604273N. The total value of the EMD contract is $1,563.644 million to include $282.280 million funded by PE 0604273M.
Primary HW Dev - (C/UCA) - One undefinitized contract action for the incorporation of Fifth Multi-Function Display (MFD) and Forward Air Stair Door design changes. The Forward Airstair door requires redesign to raise the outboard edge of the door to a position equal to or above the aircraft door frame opening when fully open to ensure the door is at or above the Water Line (WL) 256 when fully opened. The VH-92A cockpit instrument panel requires design changes and the addition of an MFD and removal of the existing tactical display.
Systems Engineering (Various) - Engineering support contracts for the Airborne Executive Phone (AEP) replacement and cyber security improvements.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering (NAWCAD Patuxent River) - Engineering support for hardware maturation, Reliability and Maintainability (R&M) analysis and Software Support Activity. Systems Engineering (NAVAIR Patuxent River) - Engineering Support Contracts to be funded at NAVAIR Headquarters and execution of Broad Agency Announcement for future communications capabilities. Training (NAVAIR Patuxent River) - Training Product Development contracts to be funded at NAVAIR Headquarters. | | | | | | | | | | | | | | | |

FINANCIAL PERFORMANCE: The VH-92A EMD contract is a Fixed Price Incentive contract with Performance Based Payments. The VH-92A program will lag OSD traditional expenditure benchmarks. The program must obligate 100 percent of the funding required by the contractor for incurred costs, termination liability, and profit. However, the program is limited to paying the contractor only 90 percent of the performance based costs and profit. Mandatory funding obligations and payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

ACRONYMS:
EMD = Engineering & Manufacturing Development
MCS = Mission Communications System
GFE = Government Furnished Equipment
MFD = Multi-Function Display

Notes:
The increase in FY 2018 Primary HW Development for the VH-92A EMD Contract is due to the decrease in funding on FY 2019 (0604273M) for this effort to better align the work with the funding and efforts.
The decrease in FY 2018 funds for the Primary HW Dev VH92A MFD/Forward Air Stair Door which is being awarded on an Undefinitized Contract Action (UCA) with the Prime contractor is based on updated estimates and schedules, funds were rephased to better align to efforts. FY 2019 funding in PE 0604273M was rephased as a result of these changes.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 34.880 | 6.566 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.446 | - |
| Integrated Logistics Support | WR | FRC : Cherry Point, NC | 20.142 | 8.705 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 28.847 | - |
| Integrated Logistics Support | WR | NAWCAD : Lakehurst, NJ | 7.431 | 2.418 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.849 | - |
| Integrated Logistics Support | WR | SPAWAR : San Diego, CA | 3.674 | 1.915 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.589 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604273N / *(U)Executive Helo Development* | Project (Number/Name)<br>3300 / *Presidential Helicopter VH-92A* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | Various | NAVAIR : Patuxent River, MD | 0.310 | 7.873 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.183 | - |
| Integrated Logistics Support | Various | Various : Various | 0.000 | 0.529 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.529 | - |
| Prior year support cost no longer funded in the FYDP | Various | Various : Various | 5.589 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.589 | - |
| | | **Subtotal** | 72.026 | 28.006 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 100.032 | N/A |

**Remarks**

Integrated Logistics Support (ILS) (NAWCAD Patuxent River) - ILS acquisition and management of the VH-92A aircraft. Evaluate contractor development of ILS efforts, Supportability Test & Evaluation, Intermediate & Depot level repair capability development.
ILS (FRC Cherry Point) - VH-92A maintenance planning, reliability centered maintenance (RCM), logistics support analysis efforts, level of repair analysis and Interactive Engineering Technical Manual (IETM) development.
ILS (NAWCAD Lakehurst) - Support Equipment (SE) planning and analysis to include procurement of Common Support Equipment (CSE), development of support equipment recommendation data (SERD) and logistics support products for support equipment and support equipment test and evaluation.
ILS (SPAWAR San Diego) - Architecture development and software integration to include certification and accreditation of the VH-92A Aviation Logistics Environment (ALE).
ILS (NAVAIR Patuxent River) - Contractor development of ILS efforts, Supportability Test & Evaluation, Intermediate & Depot level repair capability development.
ILS (Various) - Funding for various activities in support of Support Equipment (SE) Calibration and updates to the NAVAIR Standard IETM Viewer (NSIV)

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 20.583 | 9.258 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 29.841 | - |
| Developmental Test & Evaluation | MIPR | JITC : Ft. Huachuca, AZ | 0.077 | 0.639 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.716 | - |
| Developmental Test & Evaluation | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.300 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| Live Fire Test & Evaluation | WR | NAWCWD : China Lake, CA | 12.772 | 2.814 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.586 | - |
| Operational Test & Evaluation | WR | COTF : Norfolk, VA | 2.964 | 1.745 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.709 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Test & Evaluation | C/FFP | Petroleum Helicopters International, Inc : Lafayette, LA | 0.000 | 4.914 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.914 | 4.914 |
| Prior year Test and Evaluation cost no longer funded in the FYDP | Various | Various : Various | 0.109 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.109 | - |
| | | **Subtotal** | 36.505 | 19.670 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 56.175 | N/A |

**Remarks**

Developmental Test & Evaluation (DT&E) (NAWCAD Patuxent River) - Support for DT&E, contractor test (CT), government led integrated test (IT), Operational Assessment (OA), system integration lab, T&E instrumentation design, procurement, calibration, and tooling.
DT&E (JITC) - Joint Interoperability Test Certification.
DT&E (NAVAIR Patuxent River) - Performing Activity was added for the movement of Test and Evaluation Support Contracts to be funded at NAVAIR Headquarters.
Live Fire Test & Evaluation (LFT&E) (NAWCWD China Lake) - LFT&E test planning/documentation and conduct of LFT&E test events.
Operational Test & Evaluation (OT&E) (COTF) - Technical and engineering support in support of Operational Test and Integrated Test and evaluation of the VH-92A aircraft. Support efforts include documentation review, test planning, operational test design, test analysis and reporting and test operations.
Integrated Test & Evaluation (IT&E) (Petroleum Helicopters International, Inc (PHI) Lafayette, LA) - Lease of a training asset in support of test pilot proficiency training. The total value of the contract is $6.964 to include $2.050 funded by PE 0604273M.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 59.888 | 4.047 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 63.935 | - |
| Program Management Support | Various | NAVAIR : Patuxent River, MD | 0.000 | 2.250 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.250 | - |
| Transportation | Various | NAVAIR : Patuxent River, MD | 0.310 | 0.003 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.313 | - |
| Travel | Various | NAVAIR : Patuxent River, MD | 0.425 | 0.075 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Mgmt Svcs cost no longer funded in the FYDP | Various | Various : Various | 27.099 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 27.099 | - |
| | | **Subtotal** | 87.722 | 6.375 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 94.097 | N/A |

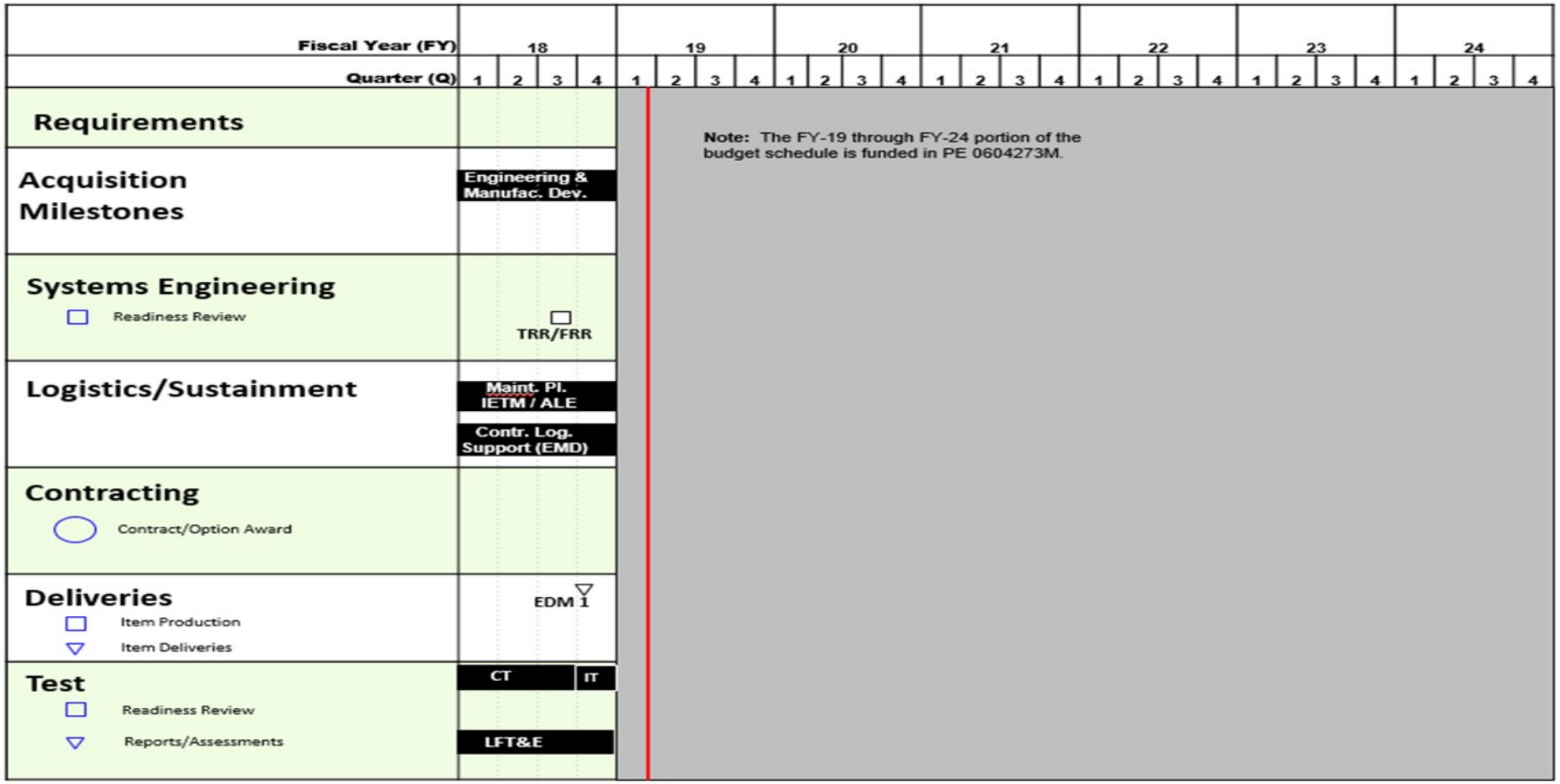
**Remarks**

Program Management Support - Project Management support for Milestone C preparation, technical reviews, risk reduction activities, contractor deliverables, configuration management, physical security, training and information assurance/cyber security.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,469.351 | 430.647 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,899.998 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604273N / *(U)Executive Helo Development* | **Project (Number/Name)**<br>3300 / *Presidential Helicopter VH-92A* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Presidential Helicopter VH-92A*** | | | | |
| Acquisition Milestones: Engineering & Manufacturing Development | 1 | 2018 | 4 | 2018 |
| Systems Engineering: Test Readiness Review/Flight Readiness Review (TRR/FRR) | 3 | 2018 | 3 | 2018 |
| Logistics/Sustainment: Maintenance Planning / IETM / ALE | 1 | 2018 | 4 | 2018 |
| Logistics/Sustainment: Contractor Logistics Support (EMD) | 1 | 2018 | 4 | 2018 |
| Deliveries: EDM 1 | 4 | 2018 | 4 | 2018 |
| Test: Developmental Test - Contractor Test | 1 | 2018 | 4 | 2018 |
| Test: Live Fire Test & Evaluation | 1 | 2018 | 4 | 2018 |
| Test: Developmental Test - Integrated Test | 4 | 2018 | 4 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604274N *I Next Generation Jammer (NGJ)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,814.232 | 584.538 | 449.429 | 524.261 | - | 524.261 | 434.223 | 178.364 | 0.000 | 0.000 | 0.000 | 3,985.047 |
| 0557: *Next Generation Jammer* | 1,814.232 | 584.538 | 449.429 | 524.261 | - | 524.261 | 434.223 | 178.364 | 0.000 | 0.000 | 0.000 | 3,985.047 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** P445 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The Next Generation Jammer (NGJ) is the next step in the evolution of Airborne Electronic Attack (AEA) and is a critical capability necessary to address current, emerging, and evolving Electronic Warfare gaps, ensure kill chain wholeness against growing threat capabilities and capacity, keep pace with enemy threat weapon systems' advancements, and support the continuous expansion of the AEA mission areas that exceed the capability of currently fielded systems. NGJ will utilize enhanced techniques and tactics to deliver significantly improved radar and communications jamming effectiveness as well as other classified capabilities. Utilizing an Open Systems Architecture that supports software and hardware updates to rapidly counter emergent and evolving threats, NGJ is a key enabler and force multiplier for operations across the spectrum of missions defined in the Defense Strategic Guidance, including strike warfare, projecting power in highly contested environments, and counterinsurgency/irregular warfare. NGJ will also address the shortfalls in scalability, flexibility, supportability, interoperability, availability, and capability of the existing AN/ALQ-99 Tactical Jamming System.

This Program Element (PE 0604274N) supports the AN/ALQ-249 Next Generation Jammer - Mid Band (NGJ-MB) (formerly known as Next Generation Jammer Increment 1) program. NGJ-MB will address AEA capability and sufficiency gaps against enemy threats operating in the middle frequency bands of the electromagnetic spectrum. NGJ-MB will provide the ability to effectively engage enemy threats from increased stand-off distances, employ increased capacity (number of jamming assignments) against enemy targets, and support agile employment by operators. The NGJ-MB system will be integrated on the EA-18G tactical aircraft and will augment and then replace the legacy AN/ALQ-99 Tactical Jamming System.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 632.936 | 459.529 | 568.662 | - | 568.662 |
| Current President's Budget | 584.538 | 449.429 | 524.261 | - | 524.261 |
| Total Adjustments | -48.398 | -10.100 | -44.401 | - | -44.401 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -10.100 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -10.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -19.390 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -51.371 | - | -51.371 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604274N *I Next Generation Jammer (NGJ)* | | | |
| • Rate/Misc Adjustments | -0.008 | 0.000 | 6.970 | - | 6.970 |
| • Congressional Directed Reductions | -19.000 | - | - | - | - |
| Adjustments | | | | | |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $49.155 million to account for the availability of prior year execution balances.

Technical: Not applicable.

Schedule: APN funding was re-phased due to required design modifications of the NGJ-MB structure. As a result, the total number of LRIP lots were reduced from 3 to 2 and production lead time was updated to 18 months for all LRIP and FRP lots. The scope, effort, and timing of IT-B2 has been redefined; as a result, the start of IT-B2 has moved from 3QFY2019 to 2QFY2020 with no impact to overall program schedule. MS FRR moved from 3QFY2019 to 2QFY2020 to align with the start of IT-B2.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604274N / *Next Generation Jammer (NGJ)* | Project (Number/Name)<br>0557 / *Next Generation Jammer* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0557: *Next Generation Jammer* | 1,814.232 | 584.538 | 449.429 | 524.261 | - | 524.261 | 434.223 | 178.364 | 0.000 | 0.000 | 0.000 | 3,985.047 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P445

**A. Mission Description and Budget Item Justification**

This Program Element (PE 0604274N) supports the NGJ-MB program. NGJ-MB will address AEA capability and sufficiency gaps against enemy threats operating in the middle frequency bands of the electromagnetic spectrum. NGJ-MB will provide the ability to effective engage enemy threats from increased stand-off distances, employ increased capacity (number of jamming assignments) against enemy targets, and support agile employment by operators. The NGJ-MB system will be integrated on the EA-18G tactical aircraft and will augment and then replace the legacy AN/ALQ-99 Tactical Jamming System Mid-Band pods.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Next Generation Jammer Mid-Band Primary Hardware Development | 371.603 | 201.876 | 285.906 | 0.000 | 285.906 |
| ***Articles:*** | - | - | 7 | - | 7 |
| ***FY 2019 Plans:***<br>Delivery of initial EDM pods to support ground chamber testing and mission systems developmental flight testing. | | | | | |
| ***FY 2020 Base Plans:***<br>Deliver aeromechanical test shapes (Pods) to support developmental flight test and envelope expansion on the EA-18G. Continue delivery EDM pods to support ground chamber testing, mission systems developmental flight testing and capabilities based test and evaluation to support Milestone C. Contract award for 7 System Demonstration Test Article Pod shipsets (2 pods per shipset) in 1st Qtr. FY 2020 which will be used for final developmental test efforts, tactics development, and operational test. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of Next Generation Jammer Mid-Band Primary Hardware Development from FY 2019 to FY 2020 is due to the funding of the seven System Demonstration Test Article shipsets and associated support. | | | | | |
| ***Title:*** Next Generation Jammer Mid-Band Systems Engineering | 59.471 | 61.604 | 58.541 | 0.000 | 58.541 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Perform Systems Engineering efforts, which will support the Mission Systems Test Readiness Review 3rd Qtr. FY 2019. Systems Engineering efforts will also be focused on the Production Readiness Review in 3rd Qtr. FY 2020 and the System Verification Review in 4th Qtr. FY 2020. System engineering efforts will continue to support Systems Integration Lab testing at government and contractor facilities and developmental ground and flight test activities.<br>***FY 2020 Base Plans:***<br>Perform Systems Engineering efforts, which will support the Aeromechanical Flight Readiness Review 2nd Qtr. FY2020, the Production Readiness Review 3rd Qtr. FY 2020 and the System Verification Review 4th Qtr. FY 2020. Perform Systems Engineering efforts to support the first Aeromechanical Pod flight in 2nd Qtr. FY2020 and the first EDM Pod radiating flight in 3rd Qtr. FY2020. System engineering efforts will continue to support Systems Integration Lab testing and platform software integration at government and contractor facilities. Review system performance data and analysis from ground and flight test activities to support program Milestone C decision in 4th Qtr. FY 2020.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of Next Generation Jammer Mid-Band Systems Engineering from FY 2019 to FY 2020 is due to less funding required for Trainers and reimbursable efforts. | | | | | |
| ***Title:*** Next Generation Jammer Mid-Band Aircraft Integration | 91.407 | 101.354 | 66.720 | 0.000 | 66.720 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Completion of SCS software H16 Build 2 integration activities, Build Readiness Review (BRR) for H16 Build 3 and subsequent integration, and follow on software support to meet Initial Operational Capability (IOC). Continued SIL testing and NGJ-MB A-kit installs into the developmental test and evaluation aircraft. Commence delivery and installation of A-kits to Operational Test and Evaluation aircraft.<br>***FY 2020 Base Plans:***<br>Completion of SCS software H16 Build 3 integration activities, initial H16 Verification and Validation activities, and subsequent integration, and follow on software support to meet Initial Operational Capability (IOC). Continued SIL testing and NGJ-MB A-kit installs into the developmental test and evaluation aircraft. Commence | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| delivery and installation of A-kits to Operational Test and Evaluation aircraft. Continued NGJ-MB Crew Vehicle Interface (CVI) improvements for H18/H20 to include Design Advisory Group (DAG) meetings.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of Next Generation Jammer Mid-Band Aircraft Integration from FY 2019 to FY 2020 is due to less funding required as Integration hardware and software completes the majority of its development. | | | | | |
| ***Title:*** Next Generation Jammer Mid-Band Test and Evaluation | 56.183 | 78.415 | 106.792 | 0.000 | 106.792 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete NGJ-MB Airworthiness and Mission Systems Test Planning. Perform loads pod calibration. Modify and instrument a F/A-18E/F to support store loads testing. Modify F/A-18E/F aircraft to support Flying Qualities, Stability and Control, Performance, and Carrier Suitability flight testing. Instrument aircraft to support captive carriage and jettison/adjacent stores flight testing. Execute initial ground testing to include Electromagnetic Environmental Effects, frequency and spatial coverage, beam stabilization and EIRP in the Air Combat Environment Test and Evaluation (ACETEF) Facility. Execute initial ground testing to include Basic Jamming Technique characterization in the High-Power Electronic Attack Technique Radiation (HEATR) Facility. Execute initial ground testing to include Reliability Growth Testing in the Electronic Attack Test and Evaluation System (EATES) Facility. | | | | | |
| ***FY 2020 Base Plans:***<br>Begin NGJ-MB Airworthiness and Mission Systems Test Execution. Perform loads pod calibration, cantilever Ground Vibration Test (GVT) and EA-18G Platform GVT. Finalize modification and instrumentation of F/A-18E/F and begin NGJ store loads testing. Finalize modification and instrumentation of F/A-18E/F aircraft and begin Flying Qualities, Stability and Control, and Performance flight testing. Finalize instrumentation of F/A-18 aircraft and begin captive carriage and jettison/adjacent stores flight testing. Finalize modification and instrumentation of EA-18G NGJ and H16 mission systems aircraft to support NGJ-MB test program. Execute ground testing to include Electromagnetic Environmental Effects, frequency and spatial coverage, beam stabilization and EIRP, as well as initial EA-18G installed mission system testing in the Air Combat Environment Test and Evaluation (ACETEF) Facility. Execute ground testing to include Basic and Advanced Jamming Technique characterization in the High-Power Electronic Attack Technique Radiation (HEATR) Facility. Execute ground testing to include Reliability Growth Testing in the Electronic Attack Test and Evaluation System (EATES) Facility. Execute ground | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| testing to include Antenna Pattern Measurements at the Facility for Antenna and RCS Measurement (FARM). Execute initial pre-MS-C Mission Systems flight testing with VX-23 at Atlantic Test Range (ATR) and VX-31 at Electronic Combat Range (ECR). Analyze and Evaluate ground and flight test data to support program MS-C Decision.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of Next Generation Jammer Mid-Band Test and Evaluation from FY 2019 to FY 2020 is due to the funding of increased ground and flight test across multiple test phases. | | | | | |
| ***Title:*** Next Generation Jammer Mid-Band Support & Management Services | 5.874 | 6.180 | 6.302 | 0.000 | 6.302 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Provide Support and Management Services associated with the NGJ-MB Program.<br>***FY 2020 Base Plans:***<br>Provide Support and Management Services associated with the NGJ-MB Program.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of Next Generation Jammer Mid-Band Support from FY 2019 to FY 2020 is due to escalation of efforts. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 584.538 | 449.429 | 524.261 | 0.000 | 524.261 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0591: *Next Generation Jammer* | 0.000 | 0.000 | 6.223 | - | 6.223 | 144.670 | 300.114 | 468.829 | 534.055 | 3,376.955 | 4,830.846 |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

**D. Acquisition Strategy**

The NGJ-MB program is designated an Acquisition Category 1C Major Defense Acquisition Program (MDAP), MDAP program number 445. The activity will focus on Engineering and Manufacturing Development (EMD) phase completing the design of the pod and building fifteen (15) EDM pods for developmental test.

**E. Performance Metrics**

First flight of an aeromechanical developmental test shape is scheduled for 2nd Qtr. FY 2020. First radiating flight of an EDM Pod is scheduled for 3rd Qtr. FY 2020.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604274N / *Next Generation Jammer (NGJ)* | Project (Number/Name)<br>0557 / *Next Generation Jammer* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - Engineering and Manufacturing Development | C/CPIF | Raytheon : El Segundo, CA | 586.519 | 363.798 | Oct 2017 | 188.256 | Dec 2018 | 272.805 | Oct 2019 | - | | 272.805 | 311.800 | 1,723.178 | 1,723.178 |
| Primary Hardware Development - AECR | C/CPIF | Raytheon : El Segundo, CA | 0.000 | 0.000 | Jun 2018 | 5.500 | Dec 2018 | 5.500 | Dec 2019 | - | | 5.500 | 0.000 | 11.000 | 11.000 |
| Primary Hardware Development - AECR | Various | Various : Various | 0.000 | 2.805 | Jun 2018 | 0.920 | Dec 2018 | 2.000 | Dec 2019 | - | | 2.000 | 0.000 | 5.725 | - |
| Primary Hardware Development - TRIMM | C/CPIF | Raytheon : El Segundo, CA | 0.000 | 5.000 | Jun 2018 | 7.200 | Dec 2018 | 5.600 | Dec 2019 | - | | 5.600 | 2.200 | 20.000 | 20.000 |
| Aircraft Integration - EMD | C/CPIF | Boeing : St. Louis, MO | 26.993 | 10.000 | Dec 2017 | 30.455 | Dec 2018 | 34.419 | Dec 2019 | - | | 34.419 | 30.824 | 132.691 | 132.691 |
| Software/Aircraft Integration | WR | NAWCWD : China Lake, CA | 31.351 | 15.254 | Nov 2017 | 19.811 | Nov 2018 | 8.514 | Nov 2019 | - | | 8.514 | 15.542 | 90.472 | - |
| Software Integration - SOR | C/CPIF | Boeing : St. Louis, MO | 26.829 | 0.000 | Oct 2017 | 1.516 | Oct 2018 | 1.285 | Oct 2019 | - | | 1.285 | 0.187 | 29.817 | 29.817 |
| Software Integration - Blk Update | WR | NAWCWD : Pt. Mugu, CA | 43.763 | 20.436 | Nov 2017 | 12.847 | Nov 2018 | 10.759 | Nov 2019 | - | | 10.759 | 19.932 | 107.737 | - |
| Software Integration H-16 | C/CPIF | Boeing : St Louis, MO | 31.024 | 33.614 | Oct 2017 | 17.000 | Oct 2018 | 3.800 | Oct 2019 | - | | 3.800 | 2.170 | 87.608 | 87.608 |
| Software Integration H-16 | SS/FFP | Northrup Grumman : Bethpage, NY | 18.626 | 12.103 | Dec 2017 | 15.724 | Dec 2018 | 7.943 | Dec 2019 | - | | 7.943 | 8.380 | 62.776 | 62.776 |
| Software Integration | WR | NAWCWD : China Lake | 1.860 | 0.000 | Nov 2017 | 4.000 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 5.860 | - |
| Systems Engineering - Trainer | Various | TBD : TBD | 0.000 | 0.000 | Nov 2017 | 3.194 | Nov 2018 | 1.955 | Nov 2019 | - | | 1.955 | 1.329 | 6.478 | 6.478 |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 120.294 | 22.261 | Nov 2017 | 26.848 | Nov 2018 | 24.755 | Nov 2019 | - | | 24.755 | 12.223 | 206.381 | - |
| Systems Engineering | WR | NAWCWD : Pt. Mugu, CA | 57.374 | 13.665 | Nov 2017 | 9.121 | Nov 2018 | 9.303 | Nov 2019 | - | | 9.303 | 11.811 | 101.274 | - |
| Systems Engineering | WR | NSWC Crane : Crane, IN | 36.395 | 7.680 | Nov 2017 | 9.556 | Nov 2018 | 8.462 | Nov 2019 | - | | 8.462 | 1.860 | 63.953 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NSWC Dahlgren : Dahlgren, VA | 4.253 | 0.145 | Nov 2017 | 0.148 | Nov 2018 | 0.150 | Nov 2019 | - | | 0.150 | 0.310 | 5.006 | - |
| Systems Engineering | SS/CPFF | Johns Hopkins University Applied Physics Lab : Laurel, MD | 43.900 | 9.460 | Feb 2018 | 9.649 | Feb 2019 | 9.842 | Feb 2020 | - | | 9.842 | 12.044 | 84.895 | 84.895 |
| Systems Engineering | WR | Naval Research Laboratory : Washington, DC | 5.268 | 0.420 | Nov 2017 | 0.428 | Nov 2018 | 0.437 | Nov 2019 | - | | 0.437 | 0.441 | 6.994 | - |
| Systems Engineering | Various | Various : Various | 10.369 | 1.273 | Nov 2017 | 0.262 | Nov 2018 | 0.267 | Nov 2019 | - | | 0.267 | 0.550 | 12.721 | - |
| Systems Engineering | SS/FFP | NSMA : Arlington, VA | 4.183 | 4.567 | Feb 2018 | 2.400 | Feb 2019 | 3.370 | Feb 2020 | - | | 3.370 | 4.370 | 18.890 | 18.890 |
| Prior Year Prod Dev no longer funded in FYDP | Various | Various : Various | 671.172 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 671.172 | - |
| | | **Subtotal** | 1,720.173 | 522.481 | | 364.835 | | 411.166 | | - | | 411.166 | 435.973 | 3,454.628 | N/A |

**Remarks**

Funding increase from FY 2019 to FY 2020 is due to the funding of the seven System Demonstration Test Articles and associated support.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eng & Tech Srvc (Non FFRDC) | Various | Various : Various | 31.149 | 5.684 | Dec 2017 | 5.988 | Dec 2018 | 6.108 | Dec 2019 | - | | 6.108 | 6.230 | 55.159 | 55.159 |
| Prior Year Support no longer funded in FYDP | Various | Various : Various | 5.382 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.382 | - |
| | | **Subtotal** | 36.531 | 5.684 | | 5.988 | | 6.108 | | - | | 6.108 | 6.230 | 60.541 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604274N / *Next Generation Jammer (NGJ)* | Project (Number/Name)<br>0557 / *Next Generation Jammer* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development T & E | WR | NAWCAD : Patuxent River, MD | 36.798 | 44.220 | Nov 2017 | 54.670 | Nov 2018 | 74.862 | Nov 2019 | - | | 74.862 | 118.434 | 328.984 | - |
| Development T & E | Various | Boeing : St Louis, MO | 4.500 | 6.612 | Oct 2017 | 15.657 | Oct 2018 | 17.371 | Oct 2019 | - | | 17.371 | 20.115 | 64.255 | 64.255 |
| Development T & E | Various | Boeing : St Louis MO | 0.000 | 3.750 | Dec 2017 | 4.875 | Dec 2018 | 7.725 | Dec 2019 | - | | 7.725 | 12.304 | 28.654 | 28.654 |
| Development T & E | Various | DynCorp : Not Specified | 0.000 | 0.000 | | 1.978 | Jan 2019 | 3.492 | Dec 2019 | - | | 3.492 | 4.541 | 10.011 | 10.011 |
| Test OT | Various | Various : Various | 0.730 | 1.601 | Mar 2018 | 1.234 | Mar 2019 | 3.343 | Mar 2020 | - | | 3.343 | 14.597 | 21.505 | - |
| Prior year T&E no longer funded in the FYDP | Various | Various : Various | 14.525 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.525 | - |
| | | **Subtotal** | 56.553 | 56.183 | | 78.414 | | 106.793 | | - | | 106.793 | 169.991 | 467.934 | N/A |

**Remarks**

Funding increases from FY 2019 to FY 2020 due to the funding of increased ground and flight test across multiple test phases.

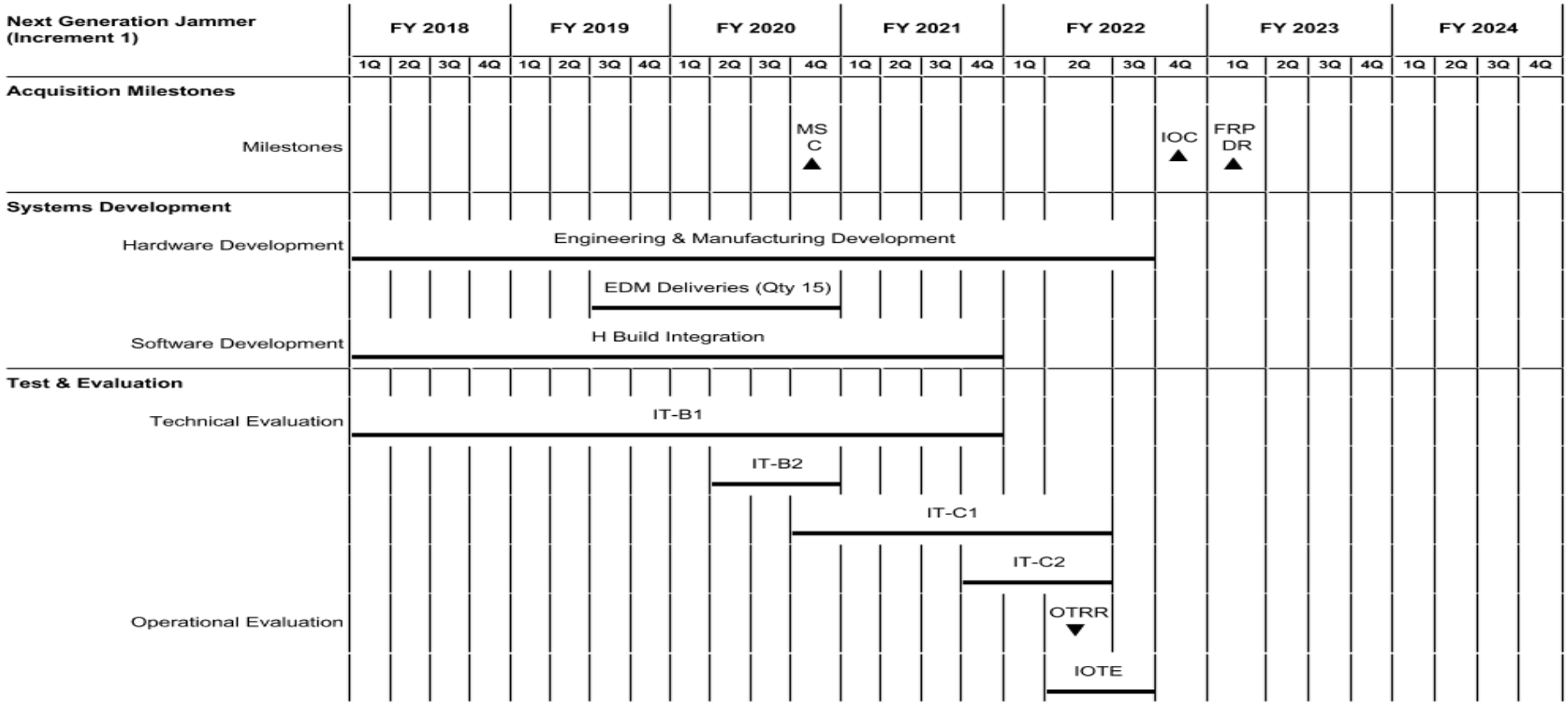
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | Various : Various | 0.968 | 0.190 | Oct 2017 | 0.192 | Oct 2018 | 0.194 | Oct 2019 | - | | 0.194 | 0.393 | 1.937 | - |
| Prior years Mgmt Svcs no longer funded in the FYDP | WR | Various : Various | 0.007 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.007 | - |
| | | **Subtotal** | 0.975 | 0.190 | | 0.192 | | 0.194 | | - | | 0.194 | 0.393 | 1.944 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,814.232 | 584.538 | | 449.429 | | 524.261 | | - | | 524.261 | 612.587 | 3,985.047 | N/A |

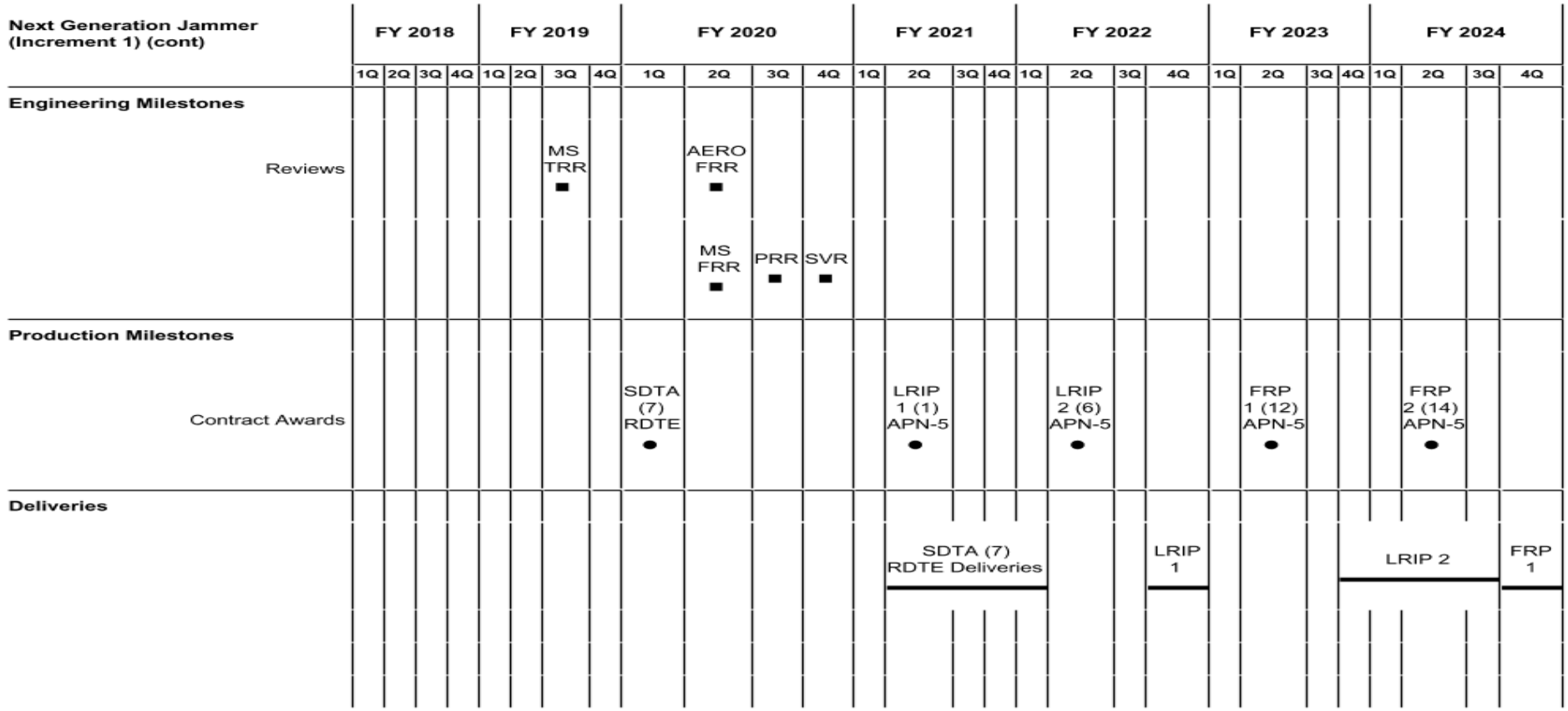
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |




*2020PB - 0604274N - 0557*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |




*2020PB - 0604274N - 0557*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Next Generation Jammer (Increment 1)*** | | | | |
| Acquisition Milestones: Milestones: Milestone C | 4 | 2020 | 4 | 2020 |
| Acquisition Milestones: Milestones: Initital Operational Capability | 4 | 2022 | 4 | 2022 |
| Acquisition Milestones: Milestones: Full Rate Production Decision Review | 1 | 2023 | 1 | 2023 |
| Systems Development: Hardware Development: Engineering & Manufacturing Development | 1 | 2018 | 3 | 2022 |
| Systems Development: Hardware Development: Engineering Development Model Deliveries | 3 | 2019 | 4 | 2020 |
| Systems Development: Software Development: H Build Integration | 1 | 2018 | 4 | 2021 |
| Test & Evaluation: Technical Evaluation: Aeromechanical Testing (IT-B1) | 1 | 2018 | 4 | 2021 |
| Test & Evaluation: Technical Evaluation: Mission Systems Testing (IT-B2) | 2 | 2020 | 4 | 2020 |
| Test & Evaluation: Technical Evaluation: Mission Systems Testing (IT-C1) | 4 | 2020 | 2 | 2022 |
| Test & Evaluation: Technical Evaluation: Aeromechanical Testing (IT-C2) | 4 | 2021 | 2 | 2022 |
| Test & Evaluation: Operational Evaluation: Operational Test Readiness Review | 2 | 2022 | 2 | 2022 |
| Test & Evaluation: Operational Evaluation: Initial Operational Test & Evaluation | 2 | 2022 | 3 | 2022 |
| ***Next Generation Jammer (Increment 1) (cont)*** | | | | |
| Engineering Milestones: Reviews: MS Test Readiness Review | 3 | 2019 | 3 | 2019 |
| Engineering Milestones: Reviews: AERO Flight Readiness Review | 2 | 2020 | 2 | 2020 |
| Engineering Milestones: Reviews: MS Flight Readiness Review | 2 | 2020 | 2 | 2020 |
| Engineering Milestones: Reviews: Production Readiness Review | 3 | 2020 | 3 | 2020 |
| Engineering Milestones: Reviews: System Verification Review | 4 | 2020 | 4 | 2020 |
| Production Milestones: Contract Awards: System Demonstration Test Article RDTEN Contract Award | 1 | 2020 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604274N / *Next Generation Jammer (NGJ)* | **Project (Number/Name)**<br>0557 / *Next Generation Jammer* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: Contract Awards: Low Rate Initial Production 1 APN-5 Contract Award | 2 | 2021 | 2 | 2021 |
| Production Milestones: Contract Awards: Low Rate Initial Production 2 APN-5 Contract Award | 2 | 2022 | 2 | 2022 |
| Production Milestones: Contract Awards: Full Rate Production 1 APN-5 Contract Award | 2 | 2023 | 2 | 2023 |
| Production Milestones: Contract Awards: Full Rate Production 2 APN-5 Contract Award | 2 | 2024 | 2 | 2024 |
| Deliveries: System Demonstration Test Article RDTEN Deliveries | 2 | 2021 | 1 | 2022 |
| Deliveries: LRIP 1 Deliveries | 4 | 2022 | 4 | 2022 |
| Deliveries: LRIP 2 Deliveries | 4 | 2023 | 3 | 2024 |
| Deliveries: FRP 1 Deliveries | 4 | 2024 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604280N *I JT Tact Radio Sys (JTRS)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 41.173 | 5.172 | 3.272 | 192.345 | - | 192.345 | 183.047 | 134.904 | 121.604 | 124.613 | Continuing | Continuing |
| 0725: *Communication Automation* | 0.000 | 0.000 | 0.000 | 3.114 | - | 3.114 | 0.505 | 0.562 | 0.620 | 0.652 | Continuing | Continuing |
| 0742: *Sub Integrated Ant System* | 0.000 | 0.000 | 0.000 | 18.925 | - | 18.925 | 16.152 | 15.680 | 13.943 | 14.219 | Continuing | Continuing |
| 0921: *NAVSTAR GPS Equipment* | 0.000 | 0.000 | 0.000 | 59.977 | - | 59.977 | 57.515 | 39.887 | 23.764 | 24.258 | Continuing | Continuing |
| 1411: *Sub Tact Comm System* | 0.000 | 0.000 | 0.000 | 14.175 | - | 14.175 | 12.977 | 14.372 | 14.674 | 14.963 | Continuing | Continuing |
| 2126: *ATDLS Integration* | 0.000 | 0.000 | 0.000 | 18.201 | - | 18.201 | 22.862 | 21.206 | 22.611 | 23.063 | Continuing | Continuing |
| 3020: *MIDS/JTRS* | 0.000 | 0.000 | 0.000 | 39.214 | - | 39.214 | 31.198 | 29.480 | 30.515 | 31.673 | Continuing | Continuing |
| 3078: *Digital Modular Radio* | 41.173 | 5.172 | 3.272 | 3.262 | - | 3.262 | 3.000 | 3.016 | 6.422 | 6.550 | Continuing | Continuing |
| 3341: *Network Tactical Common Data Link* | 0.000 | 0.000 | 0.000 | 32.432 | - | 32.432 | 35.837 | 7.861 | 6.156 | 6.279 | Continuing | Continuing |
| 4011: *Naval Coastal Warfare Surv and C4I Sys* | 0.000 | 0.000 | 0.000 | 3.045 | - | 3.045 | 3.001 | 2.840 | 2.899 | 2.956 | Continuing | Continuing |

**Program MDAP/MAIS Code:**
**Project MDAP/MAIS Code(s):** 554

**Note**

To ensure resources are aligned to enable rapid capability delivery, funding has been realigned into PE 0604280N from the following Program Elements/Projects as part of RDTEN PE Consolidation starting in FY20: PE 0204163N, Project 0725 (Communication Automation, Battle Force Tactical Network), PE 0604503N Project 0742 (Submarine Integrated Antenna system), PE 0604777N Project 0921 (NAVSTAR GPS Equipment), PE 0604503N Project 1411 (Submarine Tactical Communication System), PE 0205604N Project 2126 (ATDLS Integration), PE 0205604N Project 3020 (MIDS/JTRS), PE 0205604N Project 3341 (Network Tactical Common Data Link), PE 0604230N Project 4011 (Naval Coastal Warfare Surv and C4I Sys).
There are no New Starts associated with PE Consolidation.

**A. Mission Description and Budget Item Justification**

(0725)The Communication Automation, Battle Force Tactical Network (BFTN) program, is a continuing program that provides for automation and communications upgrades for fleet tactical users. The BFTN on each surface, subsurface, air, or fixed US Navy platform utilizes previously installed/existing Line of Sight (LOS)/Extended Line of Sight (ELOS) radios to create a secure gateway that inter-connects all users into a common Radio Frequency (RF) Tactical Network. This network directly

supports the Resilient Command and Control (RC2) posture of US-Only and North Atlantic Treaty Organization (NATO) Allied/Coalition users' tactical data information exchanges on each platform between and/or across separately dispersed RF Networks even if Satellite Communications (SATCOM) channels to shore are lost. This system is formally specified by both Fleet Commanders as a threshold capability for global maritime command control and communications in a Distributed Maritime Environment to execute current warfighting plans.

FY 2020 BFTN efforts will focus on development efforts necessary to address capability gaps and test report recommendations, and commence studies to address High Frequency (HF) Line of Sight (LOS)/Beyond Line of Sight (BLOS) radio obsolescence issues and required upgrades to meet known threats.

(0742)Submarine Integrated Antenna System: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

(0921)Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) project encompasses the Navy's efforts to pace the growing threat to GPS Navigation through the fielding of new GPS receivers, Anti-Jam (AJ) Antennas, and Assured Position Navigation and Timing (A-PNT) technologies across all Navy platform types. NAVSTAR GPS is a group of A-PNT systems that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity, and precise time data. NAVSTAR GPS provides A-PNT capability to Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) and combat systems in standalone and networked architectures throughout air and maritime domains. This project is comprised of four distinct efforts: Sea Navigation Warfare (NAVWAR), GPS-based Position, Navigation, and Timing (PNT) Service (GPNTS), Air Navigation Warfare (NAVWAR) and GPS Modernization. Sea NAVWAR provides AJ antennas and GPNTS provides GPS receivers and A-PNT technology to surface platforms, and Air NAVWAR provides AJ antennas and GPS Modernization provides GPS receivers to air platforms. Research, Development, Testing and Evaluation (RDT&E) funds are used to perform all the non-recurring GPS Surface Ship, Submarine and Aircraft Development, Integration, and Testing efforts in support of NAVSTAR GPS.

(1411)Submarine Tactical Communications System: The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

(2126)Tactical Data Link (TDL) systems includes the Advanced Tactical Data Link Systems (ATDLS) integration programs, specifically Link 16 Network, Command and Control Processor (C2P) and Link Monitoring and Management Tool (LMMT); and Network Tactical Common Data Link (NTCDL) Program which provides the ability to transmit/receive real-time intelligence, surveillance, and reconnaissance (ISR) data simultaneously from multiple sources (surface, air, sub-surface, man-portable), and exchange command and control information (voice, data, imagery, and full motion video (FMV)) across dissimilar joint, service, coalition, and civil networks. The program element also develops and tests tactical data link capability to distribute other data types to new and existing platforms.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under operational systems development because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

Link 16 Network Program provides high power shipboard and shore integrated Link 16 capability through the fielding of Joint Tactical Information Distribution System (JTIDS), Multifunctional Information Distribution System (MIDS) on Ships (MOS) and MOS Modernization (MOS Mod) including transmit and receive antennas and High

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604280N *I JT Tact Radio Sys (JTRS)* |

Power Amplifiers (HPA). JTIDS, MOS and MOS Mod utilizes the JTIDS, MIDS Low Volume Terminal (LVT), and MIDS Joint Tactical Radio System (JTRS) terminals respectively, integrates the HPA and interfaces to the shipboard antenna and Command and Control Processor (C2P). MIDS-LVT and MIDS JTRS terminals are developed by the MIDS Program Office. JTIDS terminal is no longer in production, but is undergoing product improvement to maintain interoperability and security with MIDS-LVT and MIDS JTRS. As part of the product improvement all shipboard Link 16 terminals are required to have dynamic network management (DNM), crypto modernization (CM) and frequency remapping (FR). MIDS Program Office is developing additional improvements to the MIDS-LVT and MIDS JTRS terminals. The MIDS-LVT will have Link 16 Enhanced Throughput (ET) and the MIDS JTRS will have the added capability of four net concurrent multi-netting (CMN) with current contention receive (CCR) and tactical targeting networking technology (TTNT).

(3020)The Multifunctional Information Distribution System (MIDS) program office is the Lead Service for Department of Defense (DOD) Link 16 capability and consists of two (2) product lines, MIDS Low Volume Terminal (LVT) (legacy hardware defined radio) and MIDS Joint Tactical Radio System (JTRS) (software defined radio). MIDS-LVT effort is a cooperative development program between France, Germany, Italy, Spain, and the United States with United States joint service participation (Navy, Army, Air Force), and has provided over 11,000 terminals to 48 Nations providing interoperability with North Atlantic Treaty Organization (NATO) and coalition partners. The Department of Defense (DoD) established the program to design, develop, and deliver low volume, lightweight tactical information system terminals for U.S. and allied fighter aircraft, bombers, helicopters, ships, and ground sites. MIDS-LVT significantly increases force effectiveness and minimizes hostile actions and friend-on-friend engagements. MIDS-LVT Block Upgrade 2 was executed as an ECP and provides the critical upgrades to the MIDS-LVT Terminal to enable U.S., Coalition and International partners' ability to meet the National Security Agency (NSA) mandated timelines for Cryptographic Modernization (CM) and the National Telecommunications and Information Agency (NTIA) and Federal Aviation Agency (FAA) mandated timelines for Frequency Remapping (FR).

MIDS JTRS, designed as a Pre-Planned Product Improvement (P3I) and executed as an Engineering Change Proposal (ECP) to the production MIDS-LVT configuration, and is fully compatible with MIDS-LVT. The MIDS JTRS Core Terminal achieved Full Fielding & Production (FP&F) in March 2012. It facilitated the JTRS incremental approach for fielding advanced JTRS transformational networking capability and transformed the MIDS-LVT into a 4-channel, Software Communications Architecture (SCA) compliant, Joint Tactical Radio. A form-fit-function replacement to MIDS-LVT, MIDS JTRS also adds three programmable 2 Megahertz (MHz) to 2 Gigahertz (GHz) channels capable of hosting the JTRS legacy and networking waveforms. In addition to Link 16, Tactical Air Navigation (TACAN), and voice functionality found in MIDS-LVT, MIDS JTRS has four channels and adds capabilities such as Link 16 Enhanced Throughput (ET), Link 16 FR, software programmability, CM, and Four Net Concurrent Multi-Netting with Concurrent Contention Receive (CMN-4).

MIDS JTRS Tactical Targeting Network Technology (TTNT), is a block upgrade to the MIDS JTRS CMN-4 Terminal provides an Internet Protocol-based networking capability on tactical aircraft. TTNT is a low latency, high throughput waveform that has the capability to support data exchange between fast-moving tactical aircraft, weapons, and unmanned aircraft, in addition to air, land, and sea-based command and control nodes, in a variety of air-to-air and air-to-ground missions including time sensitive targeting, air warfare, close air support, non-traditional ISR, and anti-surface warfare. TTNT capability integration into the MIDS JTRS directly supports Naval Integrated Fire Control (NIFC) capability requirements. These capabilities provide Joint Airborne Network-Tactical Edge functionality to run advanced mission applications in a cross-platform/cross-domain tactical network enterprise.

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|---|---|
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The FY20 Budget continues the development of the MIDS JTRS Link 16 transceiver hardware upgrade to allow for rapid field loadable updates. FY20 will include the Link 16 hardware Critical Design Review, Technical Readiness Review and the completion of the MIDS JTRS TTNT testing as well as the updates to the TTNT and Link 16 waveforms.

(3078)Digital Modular Radio (DMR) with Integrated Waveform (IW) and Mobile User Objective System (MUOS) capable hardware is the Navy's technical solution for the IW/MUOS requirement. The DMR AN/USC-61(C), is the first software defined radio to become a communications system standard for the U.S. Military. The compact, multi-channel DMR provides 3G, Wideband Code Division Multiple Access (WCDMA) technology, for high speed/capacity voice and data satellite communications. DMR radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense (DoD) communication platforms using frequencies ranging from 2 MHz to 2 GHz. Certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), and Satellite Communications (SATCOM) channels, the DMR system was developed to the U.S. Navy's specifications and meets all the stringent environmental, Electromagnetic Interference (EMI) and performance requirements for use in the U.S. Fleet. This system is formally specified by both Fleet Commanders as a threshold capability, for global maritime command control and communications in a Distributed Maritime Environment, to execute current warfighting plans and is required for National Command and Control capability. This program is for continued development/integration of the IW and MUOS waveforms into the DMR in accordance with Military Standards 188-181,2,3. Additionally, the enhancements of High Frequency Distribution Amplifier Group (HFDAG) and HF Automated Link Establishment (ALE) will also be developed/integrated into the DMR. HFDAG is a follow-on HF solution to fulfill transmit and receive HF communication capability with various modes of operation, such as ALE, for Navy platforms. HFDAG will utilize the existing DMR as the exciter/receiver. Generation 3 (GEN 3) HF ALE/HF wideband provides Navy users with improved HF communications, increased transmission rates from radio to radio, and serves as a supplement to SATCOM when SATCOM networks are overloaded or unavailable. IW uses a Time Division Multiple Access (TDMA) communication system in an attempt to improve satellite bandwidth utilization over legacy SATCOM waveforms. This enables demand assigned services on UHF SATCOM networks to support new applications that require better performance and higher channel throughput. The MUOS waveform will enable MUOS satellites to provide worldwide communication satellite coverage for DoD requirements. MUOS will provide functionality comparable to commercial mobile phone systems.

FY 2020 DMR will complete an assessment and test of the Military Standard mandated MUOS scanning requirements, develop a scanning Concept of Operations (CONOPS), and continue development of updated DMR Cryptographic Equipment Application (CEA) software to be compliant with the latest National Security Agency (NSA) cryptographic modernization specifications.

(3341)Network Tactical Common Data Link (NTCDL) provides the ability to transmit/receive real-time intelligence, surveillance, and reconnaissance (ISR) data simultaneously from multiple sources (air, surface, sub-surface, and man-portable) and exchange command and control information (voice, data, imagery, and full-motion video) across dissimilar joint, service, coalition, and civil networks. NTCDL provides warfighters the capability to support multiple, simultaneous, networked operations with in-service Common Data Link (CDL) equipped aircraft (e.g., F/A-35, P-3, and MH- 60R) in addition to next-generation manned and unmanned platforms (e.g., P-8 Poseidon, Triton, MQ-25 (Stingray), small tactical unmanned aircraft systems (STUAS), and Fire Scout). NTCDL benefits the Fleet by providing a horizon extension for line-of-sight systems for use in time-critical strike missions.

FY 2020 request is for NTCDL product development, to include continued development of two (2) NTCDL Engineering Development Models (EDMs) and associated software.

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|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604280N *I JT Tact Radio Sys (JTRS)* |

(4011)The Navy Expeditionary C4I project supports the Navy Expeditionary Combat Command (NECC) mission to detect, deter or interdict potential threats to DoN assets using agile, modular and scalable technology. NECC units have a number of current and future Command, Control, Communications, Computers & Intelligence (C4I) technological requirements for Tactical/Command Operations Center, tactical vehicles, combatant craft, and dismounted personnel. NECC operations require units to maintain effective command and control, develop and display a common tactical picture, and share intelligence and current operational information with higher headquarters, subordinate units, joint forces and coalition allies. Small, Medium, and Large Scale Communication Systems (LSCS) are the C4I hub for the NECC; Navy Enterprise Tactical Command and Control (NETC2) is the converged LSCS baseline. Future C4I research and development include enhanced information transport, network cyber security posture, assured communications in denied environments along with agility and mobility. Funding is required for testing and evaluation of cyber security issue associated with obsolescence of network items and if not addressed will impact the ability of the Program Office to maintain system accreditation under Risk Management Framework (RMF) revoking multiple LSCS assets authority to connectivity on the Department of Defense Information Network (DoDIN). Efforts are in alignment with NECC's strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities and maintain alignment with greater DoD initiatives, such as Joint Information Environment (JIE), Mission Partner Environment (MPE) in order to maintain interoperability and drive down DoN enterprise costs.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 4.310 | 3.272 | 3.271 | - | 3.271 |
| Current President's Budget | 5.172 | 3.272 | 192.345 | - | 192.345 |
| Total Adjustments | 0.862 | 0.000 | 189.074 | - | 189.074 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 0.862 | 0.000 | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | 189.083 | - | 189.083 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.009 | - | -0.009 |

**Change Summary Explanation**

Communication Automation, Battle Force Tactical Network (BFTN) (0725):
$3.114 million was realigned from PE 0204163N PU 0725 into this PE due to budget line item consolidation. The funding in FY19 for BFTN in PE 0204163N PU 0725 is $0.5 million due to an internal fund realignment to continue to develop engineering solutions for end of life issues, obsolescence, and to increase system ease of use for operators. Funding increases by $2.614 million to $3.114 million in FY20. Funding increase is attributed to BFTN development efforts necessary to address capability gaps and test report recommendations and commence studies to address HF Line of Sight (LOS)/Beyond Line of Sight (BLOS) radio obsolescence issues and required upgrades to meet known threats.

Submarine Integrated Antenna System (0742):
The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

NAVSTAR GPS (0921):
$59.977 million from PE 0604777N PU 0921 was moved into this PE due to budget line item consolidation. The funding in FY19 for PE 0604777N PU 0921 is $80.675 million. The FY 2020 funding request was reduced by $12.132 million to account for the availability of prior year execution balances. Also, the FY 2020 funding request was reduced due to schedule delays of United States Air Force (USAF) MGUE development resulting in the delay of Prime Vendor Integration (PVI) of the EGI-M Global Positioning System (GPS) receivers. This has resulted in a U.S. Navy two year integration delay of CH-53K, a three year delay of KC-130J, a four year delay of E-2D, as well as a four year delay of F/A-18E/F and EA-18G air platforms equipped with ANAV GPS receivers.

Technical: Electromagnetic compatibility and shock improvement of the Submarine Anti-Jam GPS Enhancement (SAGE) antenna extended development and shifted test efforts to FY 2021. GPS Modernization in FY 2020 supports PVI and testing of MAGR2K-M GPS Receivers on three (3) air platforms; F/A-18E/F, MV-22B, and CMV-22B. MAGR2K-M GPS Receivers required minimal enhanced functionality and kept the same aviation form factor as the legacy MAGR2K-S receivers. Due to the developmental complexity of EGI-M GPS Receivers, prime vendor integration and testing of EGI-M GPS Receivers will be delayed in order to incorporate enhanced capabilities as required by the EGI-M System Requirements Document(SRD). Project will support critical risk reduction efforts to ensure Navy specific requirements are met throughout the development of EGI-M GPS Receivers for five (5) air platforms: F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J.

Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) Equipment(0921): F/A-18E/F, MV-22B, and CMV-22B air platforms equipped with MAGR2K-M GPS receivers will move forward with PVI efforts. F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J air platforms with EGI-M GPS Receivers will move forward with critical risk reduction efforts to ensure Navy specific requirements are met in support of hardware development and PVI efforts.

Submarine Tactical Communications System (1411):
The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

ATDLS Integration (2126):
$18.664 million was realigned from PE 0205604N PU 2126 into this PE due to budget line item consolidation. The funding in FY19 for PE 0205604N PU2126 is $31.295 million. FY 2020 funding request was reduced by $5.0 million to account for the availability of prior year execution balances. Also, FY 2020 Link 16 budget decreased as JTIDS CM/FR, MOS CM/FR and MOS Mod prepare for a FY20 FDR. Development efforts in FY20 are limited to deficiency correction as a result of Operational Test and integration/test of the CMN enabled MIDS JTRS terminal with C2P. Link 22 budget decreased due to testing and certification activities for FY20 that are significantly lesser in scope than prior year Link 22 related development activities. LMMT budget increased in FY20 due to the commencement of CD3 Build Decision and Build Technical Review.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604280N *I JT Tact Radio Sys (JTRS)* |

MIDS/JTRS (3020):
$39.214 million was realigned from PE 0205604N PU 3020 into this PE due to budget line item consolidation. The funding in FY19 for PE 0205604N PU 3020 is $43.798 million. FY20 funding decreased due to a delay from Q1FY19 to Q2FY19 in the contract award in MIDS Modernization development (now called the Link 16 hardware transceiver upgrade). As a result, some requirements were not funded in this request (all referenced in PE 0205604N/3020). TTNT testing and platform integration continues but the main development effort completes in FY19 decreasing TTNT's funding from FY19 to FY20.

Network Tactical Common Data Link (NTCDL) (3341)
$32.432 million was realigned from PE 0205604N PU 3341 into this PE due to budget line item consolidation. The funding in FY19 for PE 0205604N PU 3341 is $13.886 million. The FY 2020 funding request was reduced by $4.576 million due to the availability of prior year execution balances. The $18.546 million increase from FY 2019 to FY 2020 provides for the continued development of two (2) NTCDL EDMs and associated software, Government Furnished Software (GFS) development, contractor-developed software development, and systems engineering in addition to maintaining the current FY 2021 EDM delivery schedule. Furthermore, this increase supports $15.0 million of contractor hardware buys and installation subtasks.

Naval Coastal Warfare Surv and C4I Systems (4011):
$3.045 million was realigned from PE 0604230N PU 0411 into this PE due to budget line item consolidation. In FY19 the funding under PE 0604230N PU 4011 is $3.043 million. Funding does not appreciably change in FY20.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0725 / *Communication Automation* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0725: *Communication Automation* | 0.000 | 0.000 | 0.000 | 3.114 | - | 3.114 | 0.505 | 0.562 | 0.620 | 0.652 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0204163N Project 0725 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The Communication Automation, Battle Force Tactical Network (BFTN) program, is a continuing program that provides for automation and communications upgrades for fleet tactical users. The BFTN on each surface, subsurface, air, or fixed US Navy platform uses previously installed/existing Line of Sight (LOS)/Extended Line of Sight (ELOS) radios (a.k.a. Radio Frequency (RF)) to create a secure gateway that inter-connects all users into a common RF Tactical Network (a.k.a. wireless). BFTN enables war-fighters to digitally communicate National Atlantic Treaty Organization (NATO) Allied/Coalition and US-Only information necessary to execute and plan in a real-time operational environment without relying on ashore application server interaction. This RF Network separately supports US-Only Carrier and Expeditionary Strike Group Commanders and maintains the digital communication ability to execute and plan with other U.S. ships, submarines or aircraft, as well as with NATO Allied/ Coalition networks, even if Satellite Communication (SATCOM) channels to shore are lost. This system is formally specified by both Fleet Commanders as a threshold capability for global maritime command control and communications in a Distributed Maritime Environment to execute current warfighting plans.

FY 2020 BFTN efforts will focus on development efforts necessary to address capability gaps and test report recommendations, and commence studies to address High Frequency (HF) Line of Sight (LOS)/Beyond Line of Sight (BLOS) radio obsolescence issues and required upgrades to meet known threats.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Battle Force Tactical Network (BFTN) | 0.000 | 0.000 | 3.114 | 0.000 | 3.114 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion. The BFTN is the Navy's program of record for high-frequency internet protocol (HFIP) and Ultra High Frequency (UHF) Line of Sight (LOS) subnet relay (SNR) communications. BFTN is the only Allied/Coalition option, providing command and control in a non-satellite communications (SATCOM) or SATCOM-denied environment and serves as a primary backup for SIPRNET (Secret Internet Protocol Router Network) in the absence of SATCOM. | | | | | |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0725 / *Communication Automation* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY19 Plans funded under PE 0204163N, Project 0725.<br><br>***FY 2020 Base Plans:***<br>BFTN will develop strategies, tactical employment concepts, and system modifications to address capability gaps and deficiencies that are needed to enable Resilient Command and Control (RC2) communications in satellite-denied environments. Begin identifying and developing system modifications necessary to address near-term and future communications threats. Efforts will focus on systems that utilize High Frequency (HF) Military Standard Waveform (MSW), such as BFTN, to boost legacy system performance. Initiate studies to analyze and assess current shipboard HF and Ultra High Frequency (UHF) Line of Sight (LOS) communications architecture, to include modifications needed for near-term threat environments, and enhancements needed for expected future threat environments. Initiate studies to assess the viability of using BFTN's chat capabilities in an organic shipboard-only environment (e.g., without shore reachback), along with the viability of using the High Frequency Global Communications System (HFGCS) and/or alternative shore systems to transmit and receive communications from legacy shipboard HF antenna systems.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0204163N, Project 0725 was $0.5 million due to internal realignments to continue to develop engineering solution for end of life issues, obsolescence, and to increase system ease of use for operators. Funding increases by $2.614 million to $3.114 million in FY20. Funding increase is attributed to BFTN development efforts necessary to address capability gaps and test report recommendations and commence studies to address HF Line of Sight (LOS)/Beyond Line of Sight (BLOS) radio obsolescence issues and required upgrades to meet known threats. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 3.114 | 0.000 | 3.114 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/3057: *Battle Force Tactical Network (BFTN)* | 1.078 | 9.723 | 14.561 | - | 14.561 | 20.290 | 21.405 | 9.887 | 10.085 | Continuing | Continuing |
| • RDTEN/0204163N/0725: *Battle Force Tactical Network (BFTN)* | 0.499 | 0.500 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 33.598 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0725 / *Communication Automation* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Battle Force Tactical Network (BFTN) - Develop the design of Full Rate Production (FRP) systems based on the High Frequency (HF) Strategy studies.

**E. Performance Metrics**

BFTN - Performance will be evaluated against defined and derived performance criteria determined from the High Frequency (HF) Strategy studies.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0725 / *Communication Automation* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development - BFTN | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.500 | Oct 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| Product Development - BFTN | TBD | FFRDC : TBD | 0.000 | 0.000 | | 0.000 | | 2.114 | Oct 2019 | - | | 2.114 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.614 | | - | | 2.614 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HF Strategy Study - BFTN | C/FFP | MIT/Lincoln Lab : Lexington, MA | 0.000 | 0.000 | | 0.000 | | 0.500 | Oct 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.500 | | - | | 0.500 | Continuing | Continuing | N/A |

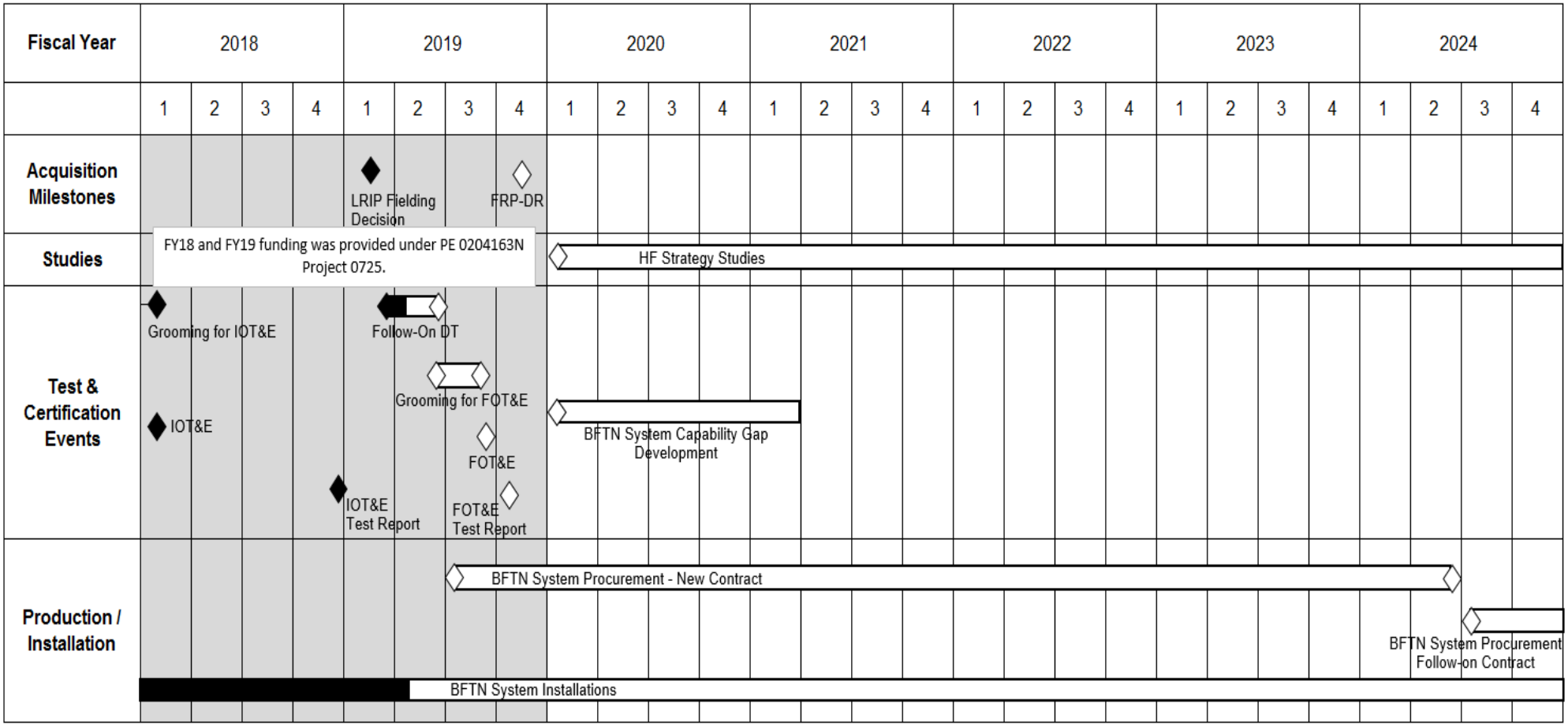
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 3.114 | | - | | 3.114 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data for BFTN is provided under PE 0204163N, Project 0725.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0725 / *Communication Automation* |

## BFTN




Note: Original FRP-DR has been updated to reflect LRIP Fielding Decision with FRP-DR in August FY 2019.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0725 / *Communication Automation* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0725*** | | | | |
| BFTN System Capability Gap Development | 1 | 2020 | 1 | 2021 |
| HF Strategy Studies | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0742: *Sub Integrated Ant System* | 0.000 | 0.000 | 0.000 | 18.925 | - | 18.925 | 16.152 | 15.680 | 13.943 | 14.219 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0604503N Project 0742 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Transition Engineering | 0.000 | 0.000 | 5.151 | 0.000 | 5.151 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 0742 | | | | | |
| ***FY 2020 Base Plans:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***Title:*** Submarine High Data Rate (SubHDR) Pre-Planned Product Improvement (P3I) | 0.000 | 0.000 | 3.480 | 0.000 | 3.480 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 0742 | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***Title:*** Advanced High Data Rate (AdvHDR)<br>***Articles:***<br>***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 0742<br>***FY 2020 Base Plans:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | 0.000<br>- | 0.000<br>- | 3.459<br>- | 0.000<br>- | 3.459<br>- |
| ***Title:*** Towed Buoy Antenna (AN/BRR-6/6B)<br>***Articles:***<br>***FY 2019 Plans:***<br>FY19 Plans funded under 0604503N, Project 0742<br>***FY 2020 Base Plans:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | 0.000<br>- | 0.000<br>- | 5.258<br>- | 0.000<br>- | 5.258<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***Title:*** Antenna Improvements | 0.000 | 0.000 | 1.577 | 0.000 | 1.577 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 0742 | | | | | |
| ***FY 2020 Base Plans:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 18.925 | 0.000 | 18.925 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0604503N/0742: *Submarine Integrated Antenna System* | 15.267 | 15.426 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 341.577 |
| • OPN/3130: *Submarine Communication Equipment* | 76.327 | 78.580 | 69.643 | - | 69.643 | 62.380 | 65.201 | 65.927 | 67.081 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

**E. Performance Metrics**

The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 15.316 | Nov 2019 | - | | 15.316 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 15.316 | | - | | 15.316 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N, Project 0742
- The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 0.644 | Feb 2020 | - | | 0.644 | 0.000 | 0.644 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.644 | | - | | 0.644 | 0.000 | 0.644 | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N, Project 0742
- The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 1.534 | Oct 2019 | - | | 1.534 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.534 | | - | | 1.534 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N, Project 0742
- The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 1.431 | Feb 2020 | - | | 1.431 | 0.000 | 1.431 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.431 | | - | | 1.431 | 0.000 | 1.431 | N/A |

**Remarks**

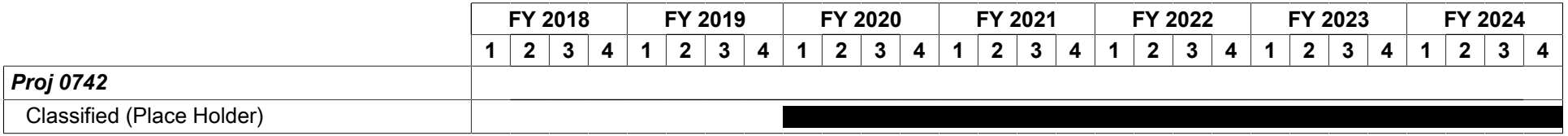
- FY18 and FY19 cost data is provided under PE 0604503N, Project 0742
- The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 18.925 | | - | | 18.925 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N, Project 0742
- The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0742*** | | | | |
| Classified (Place Holder) | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | | | | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 0921: *NAVSTAR GPS Equipment* | 0.000 | 0.000 | 0.000 | 59.977 | - | 59.977 | 57.515 | 39.887 | 23.764 | 24.258 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0604777N Project 0921 (NAVSTAR GPS Equipment) as part of RDTEN PE Consolidation starting in FY 2020. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $12.132 million to account for the availability of prior year execution balances.

Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) project (0921) encompasses the Navy's efforts to pace the growing threat to GPS Navigation through the fielding of new GPS receivers, Anti-Jam (AJ) Antennas, and Assured Position Navigation and Timing (A-PNT) technologies across all Navy platform types. NAVSTAR GPS is a group of A-PNT systems that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity, and precise time data. NAVSTAR GPS provides A-PNT capability to Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) and combat systems in standalone and networked architectures throughout air and maritime domains. This project is comprised of four distinct efforts: Sea Navigation Warfare (NAVWAR), GPS-based PNT Service (GPNTS), Air NAVWAR and GPS Modernization. Sea NAVWAR provides AJ antennas and GPNTS provides GPS Receivers and A-PNT technology to surface platforms, and Air NAVWAR provides AJ antennas and GPS Modernization provides GPS receivers to air platforms. GPS continues to be integrated in all Department of Defense (DoD) platforms and the development of enhanced and protected GPS is a national security priority. Research, Development, Testing and Evaluation (RDT&E) funds are used to perform all the non-recurring GPS Surface Ship, Submarine and Aircraft Development, Integration, and Testing efforts in support of NAVSTAR GPS.

The Air and Sea NAVWAR programs provide continued access to GPS information in a denied or impeded electronic environment. Development efforts for both programs provide improvements to various platform type antennas and ensure compatibility with the new Military Code (M-Code) signal. The Air NAVWAR program continues integration efforts using GPS Antenna System (GAS-1), Advanced Digital Antenna Production (ADAP), and other AJ antennas on air platforms while investigating smaller AJ antennas for space constrained platforms and aircraft with unique requirements. The Sea NAVWAR program integrates AJ antennas onto surface and subsurface platforms. The Sea NAVWAR program will continue to research the viability and development of smaller AJ antennas for space-constrained platforms. The program continues to support the Submarine Anti-Jam GPS Enhancement (SAGE) antenna development which integrates AJ capability into the submarine Multi-Function Mast (OE-538B) antenna system.

The GPNTS system is being developed to serve as the primary A-PNT system for the surface Navy to ensure reliable PNT capability and interoperability insertion into GPS receivers and associated C4ISR and Combat Systems in a denied environment. GPNTS pairs with AJ antennas and provides precise A-PNT data required for combat, weapons, command, control, communications, navigation, and other systems, as well as providing the time synchronization critical for network environments. GPNTS will back fit current PNT/GPS systems as well as serve as a forward fit for new platforms. GPNTS is an Open Architecture (OA) development, enabling

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

rapid software and hardware based capability improvements to be inserted without a requirement for single-source contracting. GPNTS will host the Air Force GPS Directorate-developed Military GPS User Equipment (MGUE) card, allowing access to the new GPS M-Code signal. GPNTS will provide more robust and secure GPS/ PNT capabilities than is currently in the Fleet. The system will provide the capability to migrate non-real time GPS data toward a Common Computing Environment (CCE) and provide a path for the integration of advanced navigation systems and sensors. GPNTS provides A-PNT capability to C4ISR and Combat Systems in standalone and networked architectures throughout maritime domains.

GPS Modernization executes the Navy's integration of MGUE being developed by the Air Force GPS Directorate on Navy air platforms. This effort provides Navy platforms improved access to GPS signals in challenged and jammed environments. Because of the number and diversity of all of the Navy's air and weapons platforms, this project will consist of multiple parallel efforts that integrate different M-code GPS receivers into different type model series aircraft across many program offices with central coordination and management of funding and priorities by GPS Modernization. Each platform will require unique prime vendor integration and testing that includes software updates to avionics and mission computers as well as modifications to the airframe based on Size, Weight and Power and Cost (SWaP-C) requirements. Modernized Global Positioning System (GPS) receivers will utilize the new M-Code GPS Signal in Space, incorporate enhanced cryptology, deliver greater position and time accuracy, and provide improved protection against signal spoofing as compared to legacy receivers. Additionally, GPS Modernization delivers increased GPS Anti-Jam (AJ) protection and enables blue force GPS electronic attack. This effort supports Navy compliance with Public Law 111-383 which prohibits spending funds on non-Military Code (M-Code) GPS user equipment after FY 2017.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Sea Navigation Warfare (NAVWAR) | 0.000 | 0.000 | 2.622 | 0.000 | 2.622 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Sea NAVWAR provides the Warfighter continued access to GPS through the use of AJ Antenna Systems designed to counter GPS Electronic Warfare threats due to intentional and unintentional interference on surface and subsurface platforms through the continued development of AJ antennas. The program is continuing the Submarine Anti-Jam GPS Enhancement (SAGE) antenna development, which integrates AJ capability into the submarine Multi-Function Mast (OE-538B). Sea NAVWAR will continue to research the viability and development of smaller AJ antennas for platforms with Size, Weight and Power and Cost (SWaP-C) restrictions and will ensure compatibility with the Military Code (M-Code) signal. | | | | | |
| ***FY 2019 Plans:***<br>FY 2019 Accomplishments funded under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment). | | | | | |
| ***FY 2020 Base Plans:***<br>Continue government oversight, system engineering, logistics, contracts, and programmatic management efforts for the Submarine Anti-Jam Global Positioning System (GPS) Enhancement (SAGE), and integration into the submarine Multi-Function Mast (OE-538B) antenna system development.<br><br>Conduct OE-538B Developmental Testing/Operational Testing (DT/OT) on operational submarine classes. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Begin integration testing and DT/OT preparation for smaller M-code capable AJ antennas for SWaP-C constrained surface platforms.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019 funding under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment) Sea NAVWAR was $3.292 million. Funding decreases by $0.670 million to $2.622 million in FY 2020. Funding decrease is attributed to conducting final stages of development, integration testing and documentation of SAGE and OE-538B antenna system in FY 2020. | | | | | |
| ***Title:*** Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS)<br>***Articles:*** | 0.000<br>- | 0.000<br>- | 13.242<br>- | 0.000<br>- | 13.242<br>- |
| ***Description:*** GPNTS is the Navy's next generation Assured Position Navigation and Timing (A-PNT) system. GPNTS will provide more robust and secure GPS/PNT capabilities than is currently in the Fleet. GPNTS will replace Navigation Sensor System Interface (NAVSSI) and WRN-6 systems on surface ships. GPNTS will back fit current PNT/GPS systems as well as serve as a forward fit for new platforms. The system contains Selective Availability Anti-spoofing Security Module (SAASM) GPS security architecture with a planned migration to GPS M-Code.<br>***FY 2019 Plans:***<br>FY 2019 Accomplishments funded under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).<br>***FY 2020 Base Plans:***<br>Continue the implementation of GPNTS Pre-planned Product Improvement (P3I) technology software enhancements for Assured Position Navigation and Timing (A-PNT) sensor suite integration to include: All Source Position Navigation (ASPN) algorithm, Celestial Navigation, Two Way Satellite Time Transfer (TWSTT), Public/Private Key Infrastructure (PKI), and Host-Based Security System (HBSS). Implementation requires complex software modifications and significant engineering updates. ASPN algorithm, Celestial Navigation and TWSTT address emerging threats to the GPS signal in a GPS-denied environment.<br><br>Complete software enhancements associated with the Non-GPS Aided Positioning for Surface Ships (NoGAPSS) Future Navy Capability (FNC). Prepare for and conduct test demonstration of the NoGAPSS FNC | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| including coordination of available platforms, installation of the NoGAPSS modifications, and operating the NoGAPSS capability in a relevant environment.<br><br>Begin platform coordination activities to prepare for the required Follow-on Operational Test and Evaluation (FOT&E) required to inform a fielding decision for the NoGAPSS capability.<br><br>Complete updates to all Regulatory and Statutory Acquisition documents in support of Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS) Full Rate Production (FRP) Decision as a result of successful Initial Operational Test and Evaluation (IOT&E).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019 funding under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment) GPNTS was $19.602 million. Funding decreases by $6.360 million to $13.242 million that is attributed to completion of the IOT&E. | | | | | |
| ***Title:*** Air Navigation Warfare (NAVWAR)<br>***Articles:***<br><br>***Description:*** Air NAVWAR provides the Warfighter continued access to GPS through the use of Anti-Jam (AJ) Antenna Systems designed to counter GPS Electronic Warfare threats due to intentional and unintentional interference. Air NAVWAR efforts include investigation and testing of emerging technologies to improve AJ capability and technologies such as development of miniaturized very small antenna systems to allow for the capability on small variant aircraft. Efforts will also include development to ensure antennas can accept the new Military Code (M-Code) signal.<br><br>***FY 2019 Plans:***<br>FY 2019 Accomplishments funded under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).<br><br>***FY 2020 Base Plans:***<br>Continue to fund the development and integration of miniaturized Anti-Jam (AJ) antennas to be used for various Size, Weight, and Power Constrained air platforms. Efforts include maturation of antenna solutions, chamber and flight testing, moving toward integration on specific platforms. Efforts will continue to determine air platform specific requirements and solutions. | 0.000<br>- | 0.000<br>- | 6.667<br>- | 0.000<br>- | 6.667<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue developmental effort for AJ capability on AH-1Z, UH-1Y helicopters to include Non-Recurring Engineering (NRE) for platform interface modifications; software development, integration testing, and hardware integration.<br><br>Continue to provide subject matter expertise to the MQ-4C platform as it continues integration testing, test plan development and updates; support integration and flight testing for the anti-jam capability on the MQ-4C air platform.<br><br>Continue developmental effort for AJ capability on MQ-8B and MQ-8C to include hardware integration of Multi-Platform Anti-jam GPS Navigation Antenna Integrated (MAGNA-I) and commence laboratory, ground testing and aerial flight testing.<br><br>Conduct lab testing of Global Positioning System (GPS) antennas, specifically MAGNA-I for MQ-8B/C and High-Integrity GPS (Global Positioning System) Aided Inertial Navigation System (HI-GAINS) for Unmanned Aerial Systems (UAS) at Facilities for Antenna and Radar Cross Section (RCS) Measurements (FARM).<br><br>Commence integration, testing Environmental and Electromagnetic Interference (EMI) Compliance testing of HI-GAINS for UAS.<br><br>Continue GPS Demonstrations and laboratory testing of GPS receivers with associated antennas at Facilities for Antenna and Radar Cross Section (RCS) Measurements (FARM), comparing performance between traditional nulling systems and new beam-steering antenna electronics to collect data to be used by platforms as they consider future antenna system updates.<br><br>Continue to support Aviation Assured-Position, Navigation and Timing (A-PNT) efforts by working with Navy Air platforms on navigation requirements and coordinating with surface Navy platforms to leverage synergies.<br><br>Continue to assist the Fleet with Global Positioning System (GPS) Enterprise Selective Availability Anti-Spoofing Module (SAASM) and Architecture Evolution Plan (AEP) developments, providing subject matter expertise to Naval Air Systems Command (NAVAIR) platforms for SAASM integration and monitor future GPS Directorate SAASM upgrades.<br><br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019 funding under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment) Air NAVWAR was $10.041M. Funding decreases by $3.374M to $6.667M in FY 2020. Funding decrease is attributed to the completion of Y-Code Only signal mode software updates for several platforms and the completion of Anti-Jam antenna integration efforts for the E-6B air platform. | | | | | |
| ***Title:*** Global Positioning System (GPS) Modernization | 0.000 | 0.000 | 37.446 | 0.000 | 37.446 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** GPS Modernization delivers increased GPS Anti-Jam (AJ) protection through modernized GPS receivers that will utilize the new Military Code (M-Code) GPS Signal in Space, incorporate enhanced cryptology, enable blue force GPS electronic attack, deliver greater position and time accuracy, and provide improved protection against signal spoofing as compared to legacy receivers. This project funds the Navy's integration of M-Code capable GPS receivers being developed by the United States Air Force (USAF) GPS Directorate into various receivers on Navy air platforms. This effort supports Navy's compliance with Public Law 111-383, which requires that all GPS user equipment be capable of receiving the new GPS M-Code signal after FY 2017.<br><br>To meet the Navy's mandate, system engineering and requirement development efforts must begin before actual delivery of Military GPS User Equipment (MGUE). The integration timeline of modernized GPS receivers is 5+ years from planning to test and is dependent on platform type. Each platform uses a unique GPS receiver, and has a unique GPS system configuration, which requires separate parallel efforts to include software updates to avionics and mission computers as well as modifications to the airframe based on Size, Weight and Power and Cost (SWaP-C) requirements; coordination with each Program Management Air (PMA) organization; management, oversight and support of the effort; and contracting and working with the identified Prime Vendor Integrator for the platform. Project currently consists of seven (7) parallel efforts that integrate four (4) different M-Code GPS receivers into seven (7) different type model series aircraft.<br><br>***FY 2019 Plans:***<br>FY 2019 Accomplishments funded under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).<br><br>***FY 2020 Base Plans:***<br>FY 2020 funding continues to support Prime Vendor Integration (PVI) and testing of Miniaturized Airborne GPS receiver 2000 - Modernization (MAGR2K-M) GPS Receivers on three (3) air platforms; F/A-18E/F, MV-22B, and CMV-22B. MAGR2K-M GPS Receivers required minimal enhanced functionality and kept the same aviation | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| form factor as the legacy MAGR2K-S receivers. Due to the developmental complexity of Embedded GPS Inertial - M-Code (EGI-M) GPS Receivers, PVI and testing of EGI-M GPS Receivers will be delayed in order to incorporate enhanced capabilities as required by the EGI-M System Requirements Document (SRD). FY 2020 will support critical risk reduction efforts of EGI-M GPS Receivers for five (5) air platforms: F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J.<br><br>Continue GPS Modernization efforts on the following three (3) air platforms, F/A-18E/F, MV-22B and CMV-22B, which require MAGR2K-M receivers:<br>- Support United States Air Force (USAF) box level M-Code GPS receiver performance and certification testing.<br>- Complete development of aircraft software modifications required for integrating Military Code (M-Code) Global Positioning System (GPS) receivers into aircraft<br>- Begin laboratory testing of M-Code receivers in government and vendor aircraft systems integration labs.<br>- Begin developmental flight testing of M-Code Miniaturized Airborne GPS receiver 2000 - Modernization (MAGR2K-M) GPS receivers for F/A-18E/F.<br>- Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver development.<br><br>Continue GPS Modernization efforts on the following five (5) air platforms, F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J, which require Embedded GPS/Inertial Navigation System (INS) (EGI) type of GPS receivers (ANAV, LN-351, H-764):<br>- Continue Systems Engineering and Technical Reviews (SETR) including Preliminary Design Review (PDR) and Critical Design (CDR) review for aircraft software development efforts for all air platforms.<br>- Start Non-recurring Engineering (NRE) efforts and software updates required for the design and testing of M-Code GPS receivers in for CH-53K and KC-130J.<br>- Begin laboratory testing of M-Code receivers in E-2D aircraft systems integration labs.<br>- Conduct hardware and software M-Code integration risk reduction studies to include environmental qualification assessment, System Integration Lab (SIL) stand-up, Electromagnetic Interference (EMI) qualification verification, engineering drawings update, analysis of potential support equipment changes, and product review of Engineering & Manufacturing Development (EMD) Contract Data Requirements List (CDRL) deliverables.<br>- Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver development. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| OCO:<br>N/A.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019 funding under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment) GPS Modernization was $26.540 million. Funding increases by $10.906 million to $37.446 million in FY 2020. Funding increase supports PVI and testing of MAGR2K-M GPS Receivers on three (3) air platforms; F/A-18E/F, MV-22B, and CMV-22B. FY 2020 will also support critical risk reduction efforts of Embedded Global Position System (GPS) Inertial - M-Code (EGI-M) GPS Receivers for five (5) air platforms: F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 59.977 | 0.000 | 59.977 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2657: *NAVSTAR GPS Receivers (Space)* | 15.923 | 10.703 | 32.674 | - | 32.674 | 33.721 | 29.977 | 22.938 | 23.394 | Continuing | Continuing |
| • APN/0577: *Common Avionics Changes* | 12.431 | 7.543 | 8.118 | - | 8.118 | 7.991 | 19.193 | 41.139 | 45.712 | 245.777 | 778.432 |

**Remarks**

**D. Acquisition Strategy**

Both the Navigation Warfare (NAVWAR) Air and Sea programs will continue to integrate improved anti-jam (AJ) capability onto air and sea platforms and ensure compatibility with new Military Code (M-Code) signal.

Global Positioning System (GPS)-based Positioning, Navigation, and Timing (PNT) Service (GPNTS) program will develop, acquire, and field GPNTS, a scalable Selective Availability/Anti- Spoofing Module (SAASM) GPS-based service-oriented architecture PNT system that will provide an open, extensible, modernized replacement for the current fleet PNT systems. GPNTS will also integrate Military GPS User Equipment (MGUE) and the Office of Naval Research (ONR) developed Non-GPS Aided Positioning for Surface Ships (NoGAPSS) capabilities. A firm fixed price contract was awarded March 2018 to procure Low Rate Initial Production (LRIP) and Full Rate Production (FRP) systems.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

GPS Modernization will manage the non-recurring engineering required to conduct systems engineering, integration and test of modernized GPS receivers and utilize United States Air Force (USAF) hardware contracts, and Navy air platform integration contracts.

**E. Performance Metrics**

The primary metric used for the Air NAVWAR Program is acceptable system performance in a GPS denied environment which is defined by classified values of jamming to signal ratio (J/S) identified in the Enhanced GPS User Equipment (UE) Operational Requirements Document (ORD) 562-06-00 of 7 June 2000. The performance goal is met if acceptable system performance is achieved in the threshold J/S environment cited in the classified appendix.

The primary metric used for the Sea NAVWAR is acceptable system performance in a GPS denial environment defined by classified values of jamming to J/S identified in the Sea NAVWAR Increment 2 Capabilities Production Document (CPD) (12/2008). The performance goal is met if acceptable system performance is achieved in the threshold J/S environment cited in the CPD.

The primary metric used for the GPNTS is successful completion of the system development as outlined in the GPNTS Technical Requirements Document (TRD).

The primary metric used for the GPS Modernization is successful completion of the system development as outlined in the Project Definition Document (PDD) for GPS Modernization.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air NAVWAR Development Support | WR | NAWC : Pax River, MD | 0.000 | 0.000 | | 0.000 | | 1.900 | Nov 2019 | - | | 1.900 | Continuing | Continuing | Continuing |
| Air NAVWAR Govt Eng Support | WR | NAWC : Pax River, MD | 0.000 | 0.000 | | 0.000 | | 2.000 | Dec 2019 | - | | 2.000 | Continuing | Continuing | Continuing |
| Sea NAVWAR Development Support | WR | SSC PAC, NUWC : San Diego, Newport | 0.000 | 0.000 | | 0.000 | | 0.365 | Dec 2019 | - | | 0.365 | Continuing | Continuing | Continuing |
| GPNTS SW / NoGAPSS Development | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 6.900 | Jan 2020 | - | | 6.900 | Continuing | Continuing | Continuing |
| GPNTS Development Support | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.365 | Dec 2019 | - | | 1.365 | Continuing | Continuing | Continuing |
| GPNTS Govt Eng Support | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.800 | Dec 2019 | - | | 1.800 | Continuing | Continuing | Continuing |
| GPS Mod Development F/A-18E/F MAGR2K-M | C/CPIF | Boeing : St Louis, MO | 0.000 | 0.000 | | 0.000 | | 9.500 | Dec 2019 | - | | 9.500 | Continuing | Continuing | Continuing |
| GPS Mod Development F/A-18E/F & EA-18G ANAV | C/CPIF | Boeing : St Louis, MO | 0.000 | 0.000 | | 0.000 | | 0.700 | Nov 2019 | - | | 0.700 | Continuing | Continuing | Continuing |
| GPS Mod Development E-2D | C/CPIF | Northup Gruman : Pax River, MD | 0.000 | 0.000 | | 0.000 | | 1.200 | Nov 2019 | - | | 1.200 | Continuing | Continuing | Continuing |
| GPS Mod Development MV-22B,CMV-22B | C/CPIF | Bell Boeing : Amarillo, TX | 0.000 | 0.000 | | 0.000 | | 4.800 | Feb 2020 | - | | 4.800 | Continuing | Continuing | Continuing |
| GPS Mod Development CH-53K | C/CPIF | Sikorsky : Stratford, CT | 0.000 | 0.000 | | 0.000 | | 1.400 | Nov 2019 | - | | 1.400 | Continuing | Continuing | Continuing |
| GPS Mod Development KC-130J | C/CPIF | Lockheed Martin : Not Specified | 0.000 | 0.000 | | 0.000 | | 1.400 | Nov 2019 | - | | 1.400 | Continuing | Continuing | Continuing |
| GPS Mod Development Support | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 0.000 | | 0.000 | | 2.250 | Nov 2019 | - | | 2.250 | Continuing | Continuing | Continuing |
| GPS Mod Govt Eng Support | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 0.000 | | 0.000 | | 4.200 | Nov 2019 | - | | 4.200 | Continuing | Continuing | Continuing |
| Product Development | WR | GPS Directorate : Los Angeles, CA | 0.000 | 0.000 | | 0.000 | | 0.950 | Dec 2019 | - | | 0.950 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | Govt, Contractor : San Diego, Newport | 0.000 | 0.000 | | 0.000 | | 0.250 | Nov 2019 | - | | 0.250 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 40.980 | | - | | 40.980 | Continuing | Continuing | N/A |

**Remarks**

FY 2018 and FY 2019 cost data is provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment). FY 2020 increase in funding requirements is for development, test planning and integration of MAGR2K-M GPS Receivers on three (3) air platforms; F/A-18E/F, MV-22B, and CMV-22B; and critical risk reduction efforts of EGI-M GPS Receivers for five (5) air platforms: F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contract Engineering Services | WR | BAH : San Diego, Pax River, China Lake | 0.000 | 0.000 | | 0.000 | | 1.450 | Nov 2019 | - | | 1.450 | Continuing | Continuing | Continuing |
| Enginering Services | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 0.000 | | 0.000 | | 2.442 | Nov 2019 | - | | 2.442 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 0.000 | | 0.000 | | 1.500 | Dec 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 5.392 | | - | | 5.392 | Continuing | Continuing | N/A |

**Remarks**

FY 2018 and FY 2019 cost data is provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air NAVWAR Test & Evaluation | WR | NAWC : Pax River | 0.000 | 0.000 | | 0.000 | | 1.100 | Nov 2019 | - | | 1.100 | Continuing | Continuing | Continuing |
| Sea NAVWAR Test & Evaluation | WR | SSC PAC, NUWC : San Diego, Newport | 0.000 | 0.000 | | 0.000 | | 2.000 | Nov 2019 | - | | 2.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GPNTS Test & Evaluation | WR | SSC PAC : San Diego | 0.000 | 0.000 | | 0.000 | | 1.100 | Nov 2019 | - | | 1.100 | Continuing | Continuing | Continuing |
| GPS Mod Test & Evaluation | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 0.000 | | 0.000 | | 4.500 | Nov 2019 | - | | 4.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 8.700 | | - | | 8.700 | Continuing | Continuing | N/A |

**Remarks**

FY 2018 and FY 2019 cost data is provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | BAH : San Diego, Pax River, China Lake | 0.000 | 0.000 | | 0.000 | | 4.905 | Nov 2019 | - | | 4.905 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 4.905 | | - | | 4.905 | Continuing | Continuing | N/A |

**Remarks**

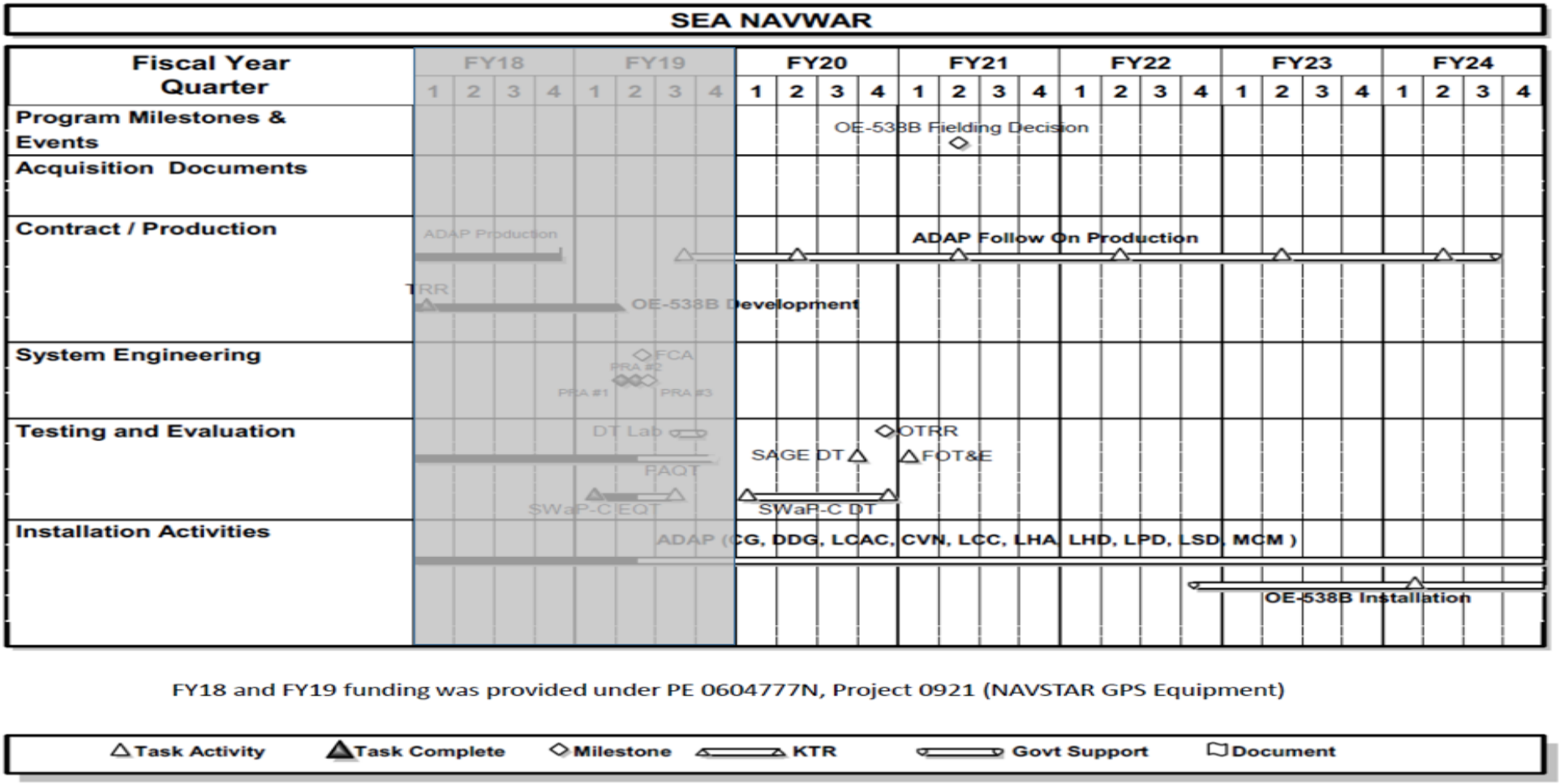
FY 2018 and FY 2019 cost data is provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 59.977 | | - | | 59.977 | Continuing | Continuing | N/A |

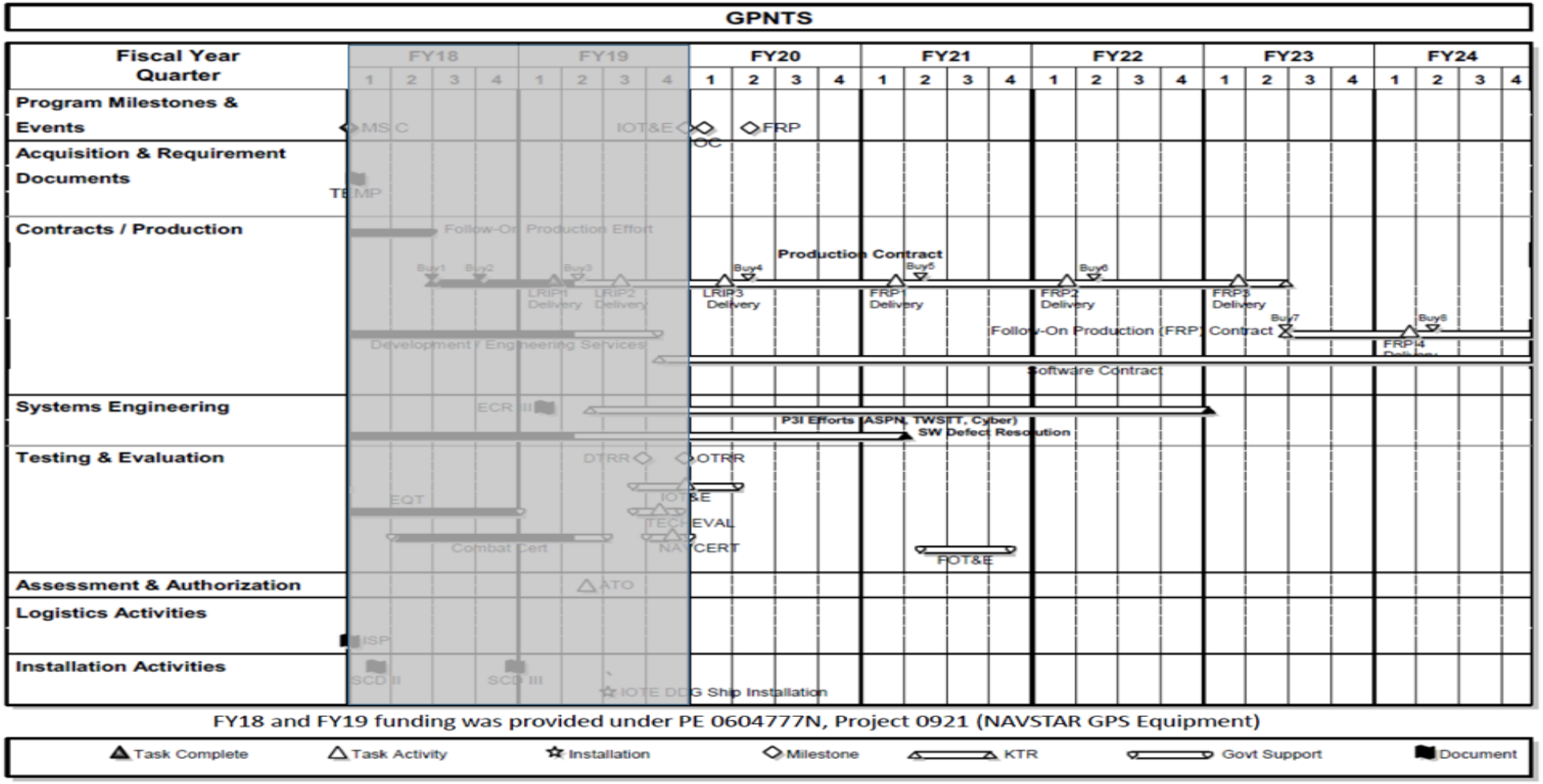
**Remarks**

FY 2018 and FY 2019 cost data is provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment).

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

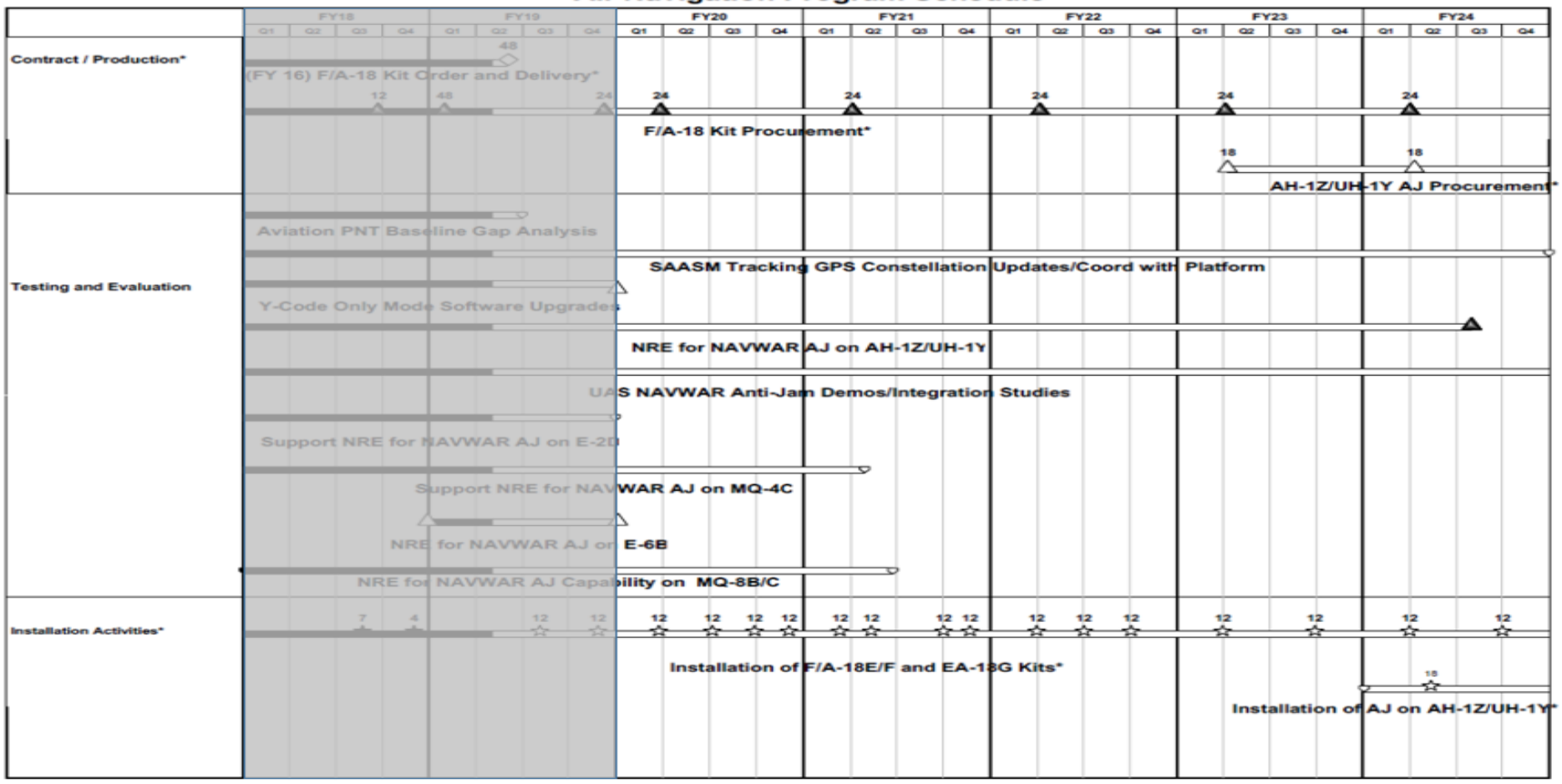


| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## Air Navigation Program Schedule

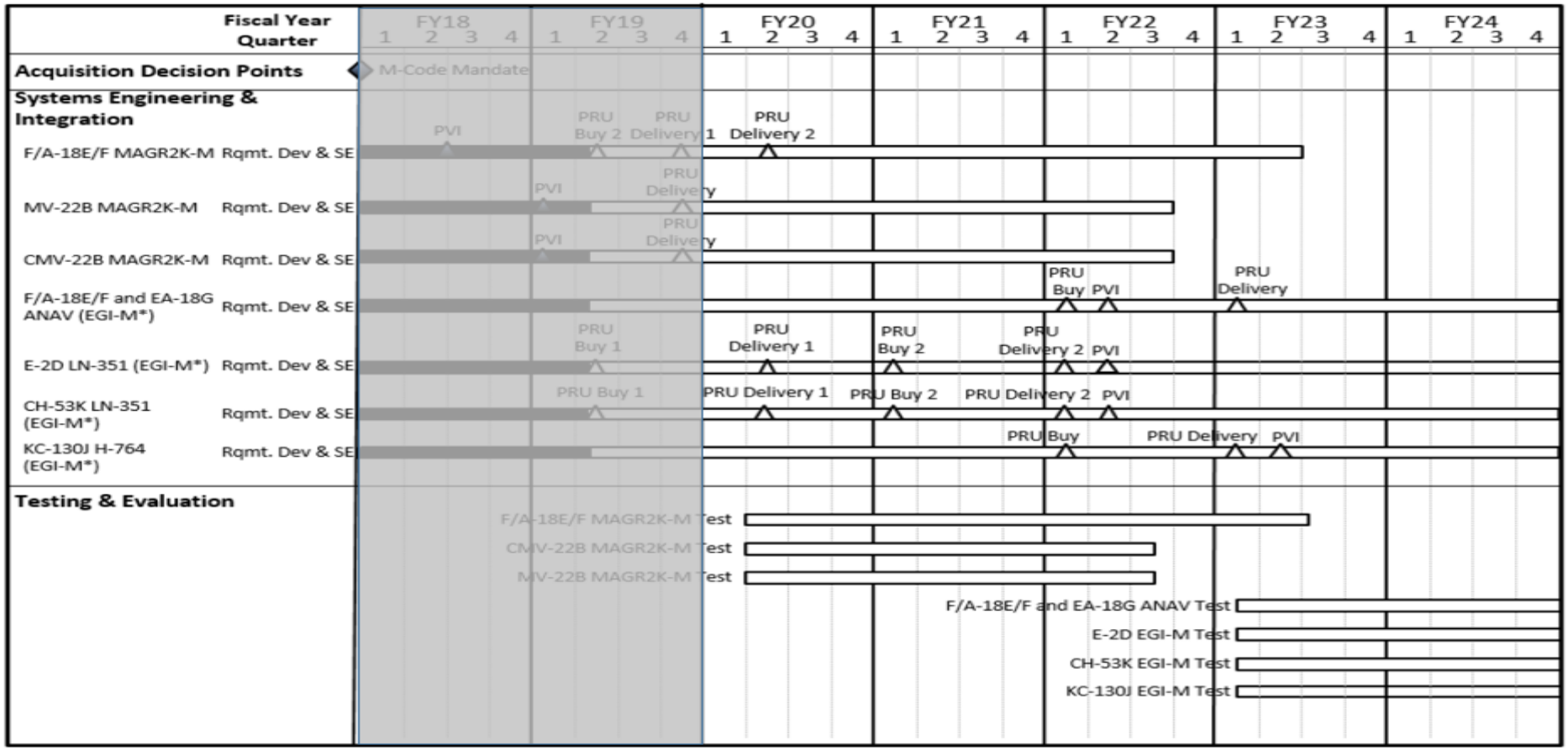



* These Schedule activities are funded with APN

FY18 and FY19 funding was provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment)

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## GPS Modernization




* EGI-M Platforms will conduct critical Risk Reduction Studies in FY19 and FY20

FY18 and FY19 funding was provided under PE 0604777N, Project 0921 (NAVSTAR GPS Equipment)

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0921*** | | | | |
| Sea NAVWAR: Sea Navigation OE-538B Fielding Decision | 2 | 2021 | 2 | 2021 |
| Sea NAVWAR: Sea Navigation ADAP Follow On Production | 1 | 2020 | 3 | 2024 |
| Sea NAVWAR: Sea Navigation Operational Test Readiness Review (OTRR) | 4 | 2020 | 4 | 2020 |
| Sea NAVWAR: Sea Navigation SAGE Development Test (DT) | 3 | 2020 | 3 | 2020 |
| Sea NAVWAR: Sea Navigation Full Operational Test & Evaluation (FOT&E) | 1 | 2021 | 1 | 2021 |
| Sea NAVWAR: Sea Navigation SWaP-C DT | 1 | 2020 | 4 | 2020 |
| Sea NAVWAR: Sea Navigation ADAP Installations | 1 | 2020 | 4 | 2024 |
| Sea NAVWAR: Sea Navigation OE-538B Installations | 4 | 2022 | 4 | 2024 |
| GPS-based PNT Service (GPNTS): GPNTS Initial Operational Capability (IOC) | 1 | 2020 | 1 | 2020 |
| GPS-based PNT Service (GPNTS): GPNTS Full Rate Production (FRP) | 2 | 2020 | 2 | 2020 |
| GPS-based PNT Service (GPNTS): GPNTS Production Contract | 1 | 2020 | 2 | 2023 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 4 | 2 | 2020 | 2 | 2020 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 5 | 2 | 2021 | 2 | 2021 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 6 | 2 | 2022 | 2 | 2022 |
| GPS-based PNT Service (GPNTS): GPNTS Follow On Production Contract | 2 | 2023 | 4 | 2024 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 7 | 2 | 2023 | 2 | 2023 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 8 | 2 | 2024 | 2 | 2024 |
| GPS-based PNT Service (GPNTS): GPNTS Software Contract | 1 | 2020 | 4 | 2024 |
| GPS-based PNT Service (GPNTS): GPNTS P3I Efforts | 1 | 2020 | 1 | 2023 |
| GPS-based PNT Service (GPNTS): GPNTS SW Defect Resolution | 1 | 2020 | 1 | 2021 |
| GPS-based PNT Service (GPNTS): GPNTS Initial Operational Test and Evaluation (IOT&E) | 1 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| GPS-based PNT Service (GPNTS): GPNTS Follow-on Operational Test and Evaluation (FOT&E) | 2 | 2021 | 4 | 2021 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2020 | 1 | 2020 | 1 | 2020 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2021 | 2 | 2021 | 2 | 2021 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2022 | 2 | 2022 | 2 | 2022 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2023 | 2 | 2023 | 2 | 2023 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2024 | 2 | 2024 | 2 | 2024 |
| Air NAVWAR: Air Navigation AH-1Z/UH-Y AJ Procurement 2023 | 2 | 2023 | 2 | 2023 |
| Air NAVWAR: Air Navigation AH-1Z/UH-Y AJ Procurement 2024 | 2 | 2024 | 2 | 2024 |
| Air NAVWAR: Air Navigation SAASM Tracking GPS Constellation Updates | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: Air Navigation NRE Integration for NAVWAR AJ on AH-1 Z/UH-1Y | 1 | 2020 | 3 | 2024 |
| Air NAVWAR: Air Navigation UAS NAVWAR Anti-Jam Demos/Integration Studies | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: Air Navigation Support NRE for NAVWAR AJ on MQ-4C | 1 | 2020 | 2 | 2021 |
| Air NAVWAR: Air Navigation Support NRE for NAVWAR AJ on MQ-8B/8C | 1 | 2020 | 2 | 2021 |
| Air NAVWAR: Air Navigation Installation of F/A-18E/F & EA-18G Kits | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: Air Navigation Installation of AJ on AH-1Z/UH-1Y | 1 | 2024 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F MAGR2K-M Rqmt. Dev & SE | 1 | 2020 | 2 | 2023 |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F MAGR2K-M PRU Delivery 2 | 2 | 2020 | 2 | 2020 |
| Air NAVWAR: GPS Modernization: GPS Modernization MV-22B MAGR2K-M Rqmt. Dev & SE | 1 | 2020 | 3 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization CMV-22B MAGR2K-M Rqmt. Dev & SE | 1 | 2020 | 3 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A18-E/F & EA-18G ANAV Rqmt. Dev & SE | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A18-E/F & EA-18G ANAV PRU Buy | 1 | 2022 | 1 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A18-E/F & EA-18G ANAV Prime Vender Integration | 2 | 2022 | 2 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A18-E/F & EA-18G ANAV PRU Delivery | 1 | 2023 | 1 | 2023 |
| Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 Rqmt. Dev & SE | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 PRU Delivery 1 | 2 | 2020 | 2 | 2020 |
| Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 PRU Buy 2 | 1 | 2021 | 1 | 2021 |
| Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 PRU Delivery 2 | 1 | 2022 | 1 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 Prime Vendor Integration | 2 | 2022 | 2 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 Rqmt. Dev & SE | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 PRU Delivery 1 | 2 | 2020 | 2 | 2020 |
| Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 PRU Buy 2 | 1 | 2021 | 1 | 2021 |
| Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 PRU Delivery 2 | 1 | 2022 | 1 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 Prime Vendor Integration | 2 | 2022 | 2 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization KC-130J H-764 Rqmt. Dev & SE | 1 | 2020 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization KC-130J H-764 PRU Buy | 1 | 2022 | 1 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization KC-130J H-764 PRU Delivery | 1 | 2023 | 1 | 2023 |
| Air NAVWAR: GPS Modernization: GPS Modernization KC-130J H-764 Prime Vendor Integration | 2 | 2023 | 2 | 2023 |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F MAGR2K-M Test | 2 | 2020 | 3 | 2023 |
| Air NAVWAR: GPS Modernization: GPS Modernization CMV-22B MAGR2K-M Test | 2 | 2020 | 3 | 2022 |
| Air NAVWAR: GPS Modernization: GPS Modernization MV-22B MAGR2K-M Test | 2 | 2020 | 3 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F and EA-18G ANAV Test | 1 | 2023 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization E-2D EGI-M Test | 1 | 2023 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization CH-53K EGI-M Test | 1 | 2023 | 4 | 2024 |
| Air NAVWAR: GPS Modernization: GPS Modernization KC 130J EGI-M Test | 1 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | | | | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1411: *Sub Tact Comm System* | 0.000 | 0.000 | 0.000 | 14.175 | - | 14.175 | 12.977 | 14.372 | 14.674 | 14.963 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0604503N Project 1411 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Common Submarine Radio Room (CSRR) | 0.000 | 0.000 | 10.126 | 0.000 | 10.126 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 1411 | | | | | |
| ***FY 2020 Base Plans:***<br>The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***Title:*** Undersea Assured Command & Control (UAC2) | 0.000 | 0.000 | 0.652 | 0.000 | 0.652 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 1411 | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| ***Title:*** Link 16 | 0.000 | 0.000 | 3.397 | 0.000 | 3.397 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0604503N, Project 1411<br>***FY 2020 Base Plans:***<br>The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 14.175 | 0.000 | 14.175 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0604503N/1411: *Submarine Tactical Communication System* | 14.443 | 16.068 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 258.848 |
| • OPN/3130: *Submarine Communication Equipment* | 76.327 | 78.580 | 69.643 | - | 69.643 | 62.380 | 65.201 | 65.927 | 67.081 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

**D. Acquisition Strategy**

The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

**E. Performance Metrics**

The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 11.032 | Dec 2019 | - | | 11.032 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 11.032 | | - | | 11.032 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N Project 1411
- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 2.006 | Nov 2019 | - | | 2.006 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.006 | | - | | 2.006 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N Project 1411
- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 0.143 | Nov 2019 | - | | 0.143 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.143 | | - | | 0.143 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N Project 1411
- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 0.994 | Nov 2019 | - | | 0.994 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.994 | | - | | 0.994 | Continuing | Continuing | N/A |

**Remarks**

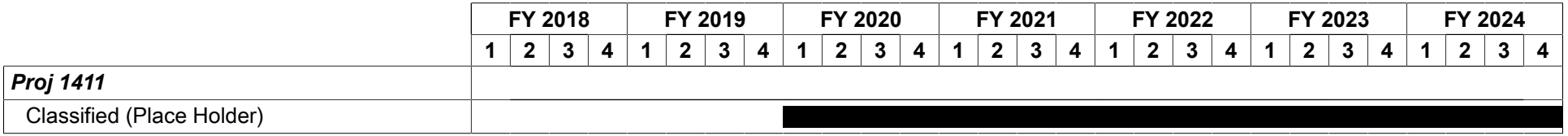
- FY18 and FY19 cost data is provided under PE 0604503N Project 1411
- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 14.175 | | - | | 14.175 | Continuing | Continuing | N/A |

**Remarks**

- FY18 and FY19 cost data is provided under PE 0604503N Project 1411
- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1411*** | | | | |
| Classified (Place Holder) | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | | | | Project (Number/Name)<br>2126 / *ATDLS Integration* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2126: *ATDLS Integration* | 0.000 | 0.000 | 0.000 | 18.201 | - | 18.201 | 22.862 | 21.206 | 22.611 | 23.063 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0205604N Project 2126 as part of the RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

FY 2020 funding request was reduced by $5.0 million to account for the availability of prior year execution balances.

This project develops and improves the Navy's Tactical Data Link (TDL) systems. It includes the Advanced Tactical Data Link Systems (ATDLS) Integration Programs, specifically Link 16 Network, Command and Control Processor (C2P) and Link Monitoring and Management Tool (LMMT).

ATDLS Integration Program develops new and improved capabilities for Navy TDL users. The ATDLS Integration Programs perform technical analyses and engineering efforts associated with implementation of new technology to enable rapid introduction of new products and technology, prevent obsolescence, and end of support issues. The programs insert new technology enhancements via incremental software & hardware upgrades and deliver as annual build release. The Navy Link 16 Network Increment II consists of Dynamic Network Management (DNM), Cryptographic Modernization (CM) and Frequency Remapping (FR). C2P Technology Refresh (TR) and C2P Interoperability will modernize legacy C2P processing components to address C2P component obsolescence and fleet interoperability issues. C2P is a critical component in the Aegis Ballistic Missile Defense (BMD) architecture. C2P Modernization is a service life extension program required to sustain C2P support of Naval Integrated Air and Missile Defense (IAMD) and BMD capabilities. Link 22 development and integration into the C2P allows for standard data link communication with Coalition forces. LMMT will upgrade commercial off-the-shelf hardware and modernize software operating systems. LMMT will improve TDL performance monitoring and management in support of the Integrated Air & Missile Defense (IAMD) and Ballistic Missile Defense (BMD) missions.

Link 16 Network Increment II: (1) Develop and implement CM and FR mandates as a product improvement into Link 16 terminals and integration into shore sites, ship (NGC2P, Next Generation Command and Control Processor), and current Navy Joint Tactical Information Distribution System (JTIDS) airborne platforms; (2) Developmental Testing (DT) / Operational Testing (OT) of Navy platform CM/FR modifications; (3) provide product improvement for continued production capability Multifunctional Information Distribution System (MIDS) on Ship (MOS) Modernization (MOS Mod) and extensibility to new Tactical Data Link capabilities of shipboard Link 16 terminals, (4) qualification of replacement shipboard Link 16 antenna to replace end of life existing antenna. JTIDS, MOS CM/FR, and MOS Mod efforts are in support of NSA and Joint Chiefs of Staff mandates for the modernization of the cryptographic algorithm used in Link 16 terminals and the Department of Defense and the Department of Transportation Memorandum of Agreement for the implementation of a capability to remap any 14 of the existing 51 frequencies in order to remain operable within the United States and its possessions. All Link 16 terminals are required to have this capability to support Link 16 Interoperability.

FY2020 Justification: Complete JTIDS CM/FR shipboard integrated testing and data reduction including operational test. Continue preparations and conduct JTIDS CM/FR Fielding Decision Review (FDR). Complete MOS CM/FR integrated testing and data reduction including operational test. Continue preparations and conduct

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

MOS CM/FR Fielding Decision Review (FDR). Complete government testing and data reduction including for operational testing of MOS Mod. Continue preparations and conduct MOS Mod FDR fielding decision review. Develop C2P software update to implement CMN capability. Initiate government integration and testing of CMN capability with MOS Mod and C2P. Continue Link 16 Network integration logistics support.

Command and Control Processor (C2P) Technology Refresh (TR) funds a product improvement effort to the legacy C2P hardware components and allows legacy C2P software to execute on modern processors, thereby extending its effective service life. Product improvement efforts will include C2P software development, hardware integration, update of the C2P development environment to promote sustainability and testing to include follow-on test and evaluation (FOT&E) of the C2P TR baseline. Software development contractors will transform C2P legacy software code with modern supportable software code. "C2P, Phase 3", Increment 2 is planned to include Link 22, which is a modernized replacement for Link 11, providing beyond line of sight (BloS) tactical data communication system utilizing fixed frequency or frequency hopping techniques in the high frequency (HF) (3-30 Megahertz (MHz)) and/or the ultra high frequency (UHF) (225-400 MHz) bands. C2P Modernization is required to address Cybersecurity challenges, Operational Availability (Ao) challenges and sustainment issues associated with the current C2P system configurations. C2P Modernization funds the transition of the C2P's legacy CMS-2Y software code (old Navy unique computer programming language from the 1980s) to a modern software language. Transition to a modern software language is required to sustain the system software and to address growing cybersecurity and Ao challenges and to enable more affordable transition to new hardware processing components as a result of commercial off the shelf processor obsolescence.

FY2020 Justification (C2P): Continue C2P Link 22 Aegis combat system testing, conduct developmental testing and prepare for Link 22 Follow-on Test and Evaluation (FOT&E). Continue C2P Modernization engineering assessment and design. Conduct C2P Modernization design reviews in preparation for C2P Modernization development.

Link Monitoring and Management Tool (LMMT) is a system delivered on commercial off-the-shelf hardware providing gateway functions for multiple Tactical Data Link (TDL) interface, routing and display of TDL data to include Link 16 and Joint Range Extension (JRE). LMMT is also capable of performing TDL network planning, monitoring, management, data forwarding between the TDLs and providing tactical data to the Global Command and Control System (GCCS) for establishing the common operational picture. LMMT requirements will be incrementally developed and delivered in capability drops via the Joint Capabilities Integration Development System (JCIDS) IT Box approach.

FY 2020 Justification (LMMT): Conduct Capability Drop (CD) 3 Build Decision and commence CD 3 development.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Link 16 Network Increment II - Cryptographic Modernization (CM) / Frequency Remapping (FR) | 0.000 | 0.000 | 3.384 | 0.000 | 3.384 |
| ***Articles:*** | - | - | 1 | - | 1 |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0205604N, Project 2126 | | | | | |
| ***FY 2020 Base Plans:***<br>Complete JTIDS CM/FR shipboard integrated testing and data reduction including for operational test. Continue preparations and conduct JTIDS CM/FR Fielding Decision Review (FDR). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete MOS CM/FR integrated testing and data reduction including for operational test.<br>Continue preparations and conduct MOS CM/FR Fielding Decision Review (FDR).<br>Complete government testing and data reduction including for operational testing of MOS Mod.<br>Continue preparations and conduct MOS Mod FDR fielding decision review.<br>Complete integration and test MIDS JTRS CMN terminal into MOS Modernization terminal.<br>Develop C2P software update to implement CMN capability.<br>Initiate government integration and testing of CMN capability with MOS Mod and C2P<br>Continue Link 16 Network integration logistics support.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0205604N, Project 2126 Link 16 Increment II was $10.937 million. Funding decreases by $7.553 million to $3.384 million in FY20. Link 16 budget requirement decreased from FY19 to FY20 as JTIDS CM/FR, MOS CM/FR and MOS Mod conduct Operational Test in FY19 with preparation for a FY20 FDR. Development efforts in FY20 are limited to deficiency correction as result of Operational Test and integration/test of the CMN enabled MIDS JTRS terminal with C2P. | | | | | |
| ***Title:*** Command and Control Proecessor (C2P)<br>***Articles:***<br>***FY 2019 Plans:***<br>FY19 Plans funded under PE 0205604N, Project 2126<br>***FY 2020 Base Plans:***<br>Conduct C2P Link 22 Aegis combat system testing and prepare for Link 22 Follow-on Test and Evaluation (FOT&E).<br>Conduct C2P Modernization design reviews in preparation for C2P Modernization development.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0205604N, Project 2126 was $18.707 million. Funding decreased by $6.117 million to $12.590 million in FY20. Funding decrease is attributed to the Link 22 development phase completing in FY19 | 0.000<br>- | 0.000<br>- | 12.590<br>- | 0.000<br>- | 12.590<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and transitioning to testing and certification activities for FY20 that are significantly lesser in scope than prior year Link 22 related development activities. | | | | | |
| ***Title:*** Link Monitoring and Management Tool (LMMT) | 0.000 | 0.000 | 2.227 | 0.000 | 2.227 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 Plans funded under PE 0205604N, Project 2126 | | | | | |
| ***FY 2020 Base Plans:***<br>Conduct Capability Drop 3 (CD3) Build Decision and commence CD3 development.<br>Conduct Build Technical Review (BTR) for CD3. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0205604N, Project 2126 was $1.651 million. Funding increased by $0.576 million to $2.227 million in FY20 due to the commencement of CD3 Build Decision and Build Technical Review. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 18.201 | 0.000 | 18.201 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2614: *Adv Tact Data Link Sys (ATDLS)* | 34.873 | 30.085 | 52.753 | - | 52.753 | 66.952 | 82.338 | 57.660 | 61.728 | Continuing | Continuing |
| • RDTEN/0205604N/2126: *Adv Tact Data Link Sys (ATDLS)* | 21.012 | 31.295 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 848.673 |

**Remarks**

**D. Acquisition Strategy**

The JTIDS Crypto Modernization (CM)/Frequency Remapping (FR) development and low rate initial production (LRIP) contract was awarded to Data Link Solutions (DLS). The associated production contract for JTIDS CM/FR will be competitively awarded to support procurement after decision review. Multifunctional Information Distribution System (MIDS) on Ship (MOS) CM/FR will be accomplished through integration of the MIDS LVT Block Upgrade 2 (BU) into the existing MOS cabinet and development of a High-Power Amplifier (HPA) bypass switch. HPA bypass switch development was conducted by SSC Pacific. Production of HPA Switch will be performed by SSC PAC for existing MOS systems. To address the WIN 10 implementation for the MOS system, a new MOS Terminal Controller hardware and

software has been developed and will be produced on the MOS Lot 4 contract. MOS MOD contract will provide three engineering manufacturing development (EMD) units for developmental and operational testing. The MOS MOD contract will also provide full rate production units. A second MOS Mod contract for production will be competitively awarded to extend the production period and increase capacity.

The C2P Technology Refresh (TR) and Link 22 development contract was awarded to Northrop Grumman. The Data Terminal Set (DTS) contract to support the Link 11/ Link 22 functions of the C2P system was awarded in August 2016. An existing IDIQ MAC contract will be used to procure initial TR units with a new ATDLS production contract planned for future procurements in FY 19 and beyond.

The Link Monitoring and Management Tool (LMMT) capability will replace previously-fielded Air Defense Systems Integrator (ADSI) systems. LMMT will leverage existing government-off-the-shelf (GOTS) software and commercial-off-the-shelf (COTS) hardware. LMMT capabilities are implemented primarily in software and will be developed in capability drops (CDs). Existing GOTS software will be updated to incorporate network performance monitoring and management capabilities by Space and Naval Warfare (SPAWAR) System Center (SSC).

**E. Performance Metrics**

Link 16 Network Dynamic Network Management (DNM): Successfully achieve initial operational capability. Successfully conduct full deployment decision review. Successfully complete operation test readiness review (OTRR). Successfully complete developmental test / operational test.

Link 16 Network Cryptographic Modernization: Successful implementation of updated cryptographic algorithm as specified by National Security Agency (NSA) certification in Joint Tactical Information Distribution System (JTIDS), Multifunctional Information Distribution System (MIDS) on Ship (MOS), and MOS Modernization (MOS Mod) Link 16 terminals.

Link 16 Network Frequency Remapping: Successful implementation of a frequency remapping capability as specified in Department of Defense/Department of Transportation Memorandum of Agreement regarding the 960-1215 MHz frequency band of 31 Dec 02 in Joint Tactical Information Distribution System (JTIDS), Multifunctional Information Distribution System (MIDS) on Ship (MOS) and MOS Modernization (MOS Mod) Link 16 Terminals.

Link 16 Antenna: Meet existing antenna performance specifications.

Link 16 Network Production Capability: Production shipboard Link 16 terminals available to meet new construction shipboard requirements.

Command and Control Processor (C2P): Successfully achieve C2P Technology Refresh fielding and thereby maintain operational availability.

Link 22: Successfully achieve Link 22 implementation fielding, meeting operational requirement.

LMMT: Successfully meet operational requirements and achieve fielding decision reviews (FDR) for Capability Drops 1, 2 and 3.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>2126 / *ATDLS Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link 16 Network Technical Design Agents | C/CPFF | SeaPort-E : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.832 | Oct 2019 | - | | 0.832 | Continuing | Continuing | Continuing |
| Link 16 Network Systems Engineering | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.103 | Oct 2019 | - | | 1.103 | Continuing | Continuing | Continuing |
| C2P Systems Engineering | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 5.397 | Oct 2019 | - | | 5.397 | Continuing | Continuing | Continuing |
| C2P IV&V | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.506 | Oct 2019 | - | | 0.506 | Continuing | Continuing | Continuing |
| C2P Development & Integration | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 3.288 | Oct 2019 | - | | 3.288 | Continuing | Continuing | Continuing |
| LMMT Development | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.955 | Oct 2019 | - | | 0.955 | Continuing | Continuing | Continuing |
| LMMT Systems Engineering | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.594 | Oct 2019 | - | | 0.594 | Continuing | Continuing | Continuing |
| LMMT IV&V | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.197 | Oct 2019 | - | | 0.197 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 12.872 | | - | | 12.872 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0205604N Project 2126

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link 16 Network T&E | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.310 | Oct 2019 | - | | 1.310 | Continuing | Continuing | Continuing |
| C2P T&E | WR | SPAWARSYSCEN PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.800 | Oct 2019 | - | | 1.800 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 3.110 | | - | | 3.110 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0205604N Project 2126

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>2126 / *ATDLS Integration* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link 16 Network Program Management Support | C/CPFF | SeaPort-E : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.139 | Oct 2019 | - | | 0.139 | Continuing | Continuing | Continuing |
| C2P Program Management Support | C/CPFF | SeaPort-E : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.800 | Oct 2019 | - | | 0.800 | Continuing | Continuing | Continuing |
| C2P Systems Engineering Support | C/CPFF | SeaPort-E : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.800 | Oct 2019 | - | | 0.800 | Continuing | Continuing | Continuing |
| LMMT Program Management | C/CPFF | SeaPort-E : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.480 | Oct 2019 | - | | 0.480 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.219 | | - | | 2.219 | Continuing | Continuing | N/A |

**Remarks**

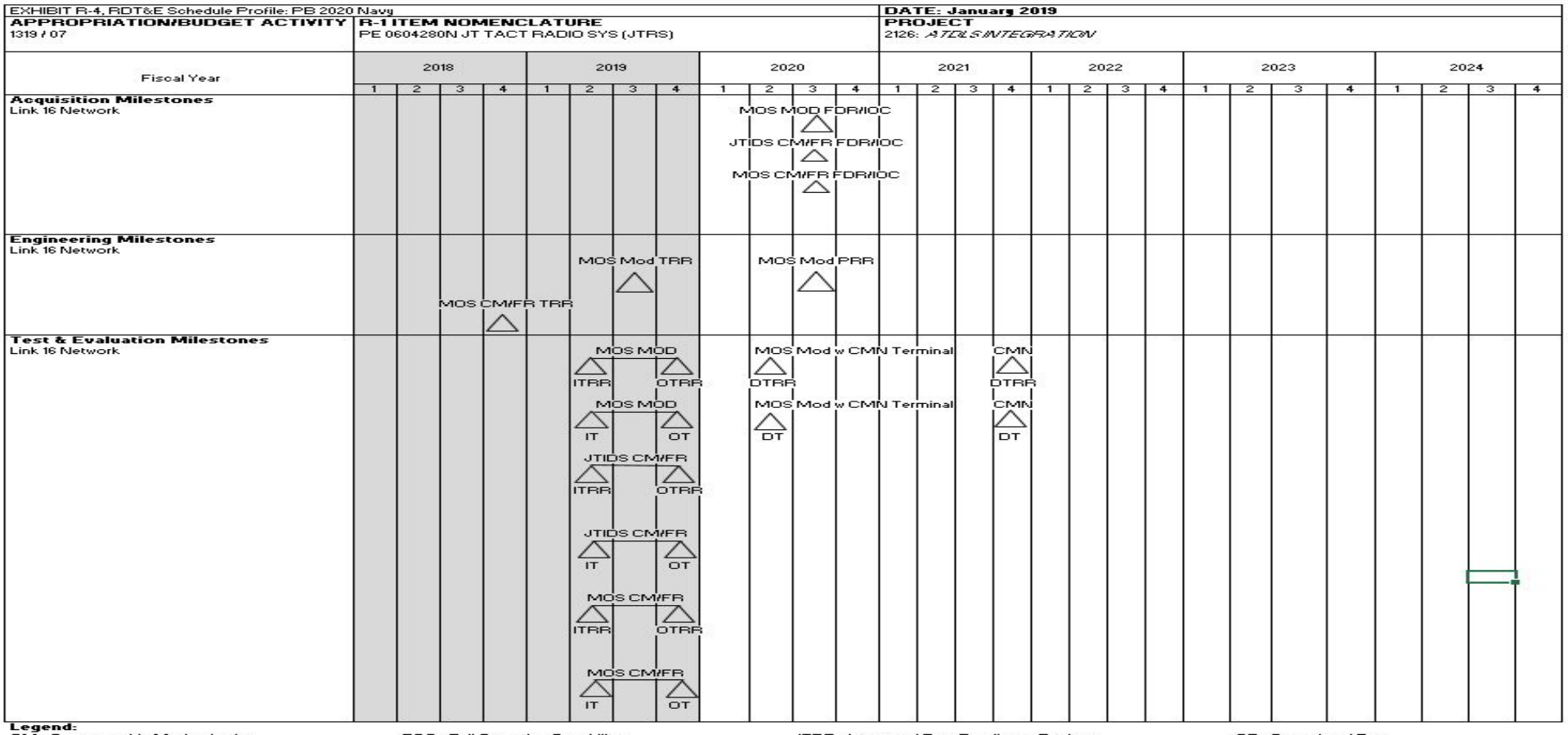
FY18 and FY19 cost data is provided under PE 0205604N Project 2126

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 18.201 | | - | | 18.201 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0205604N Project 2126

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

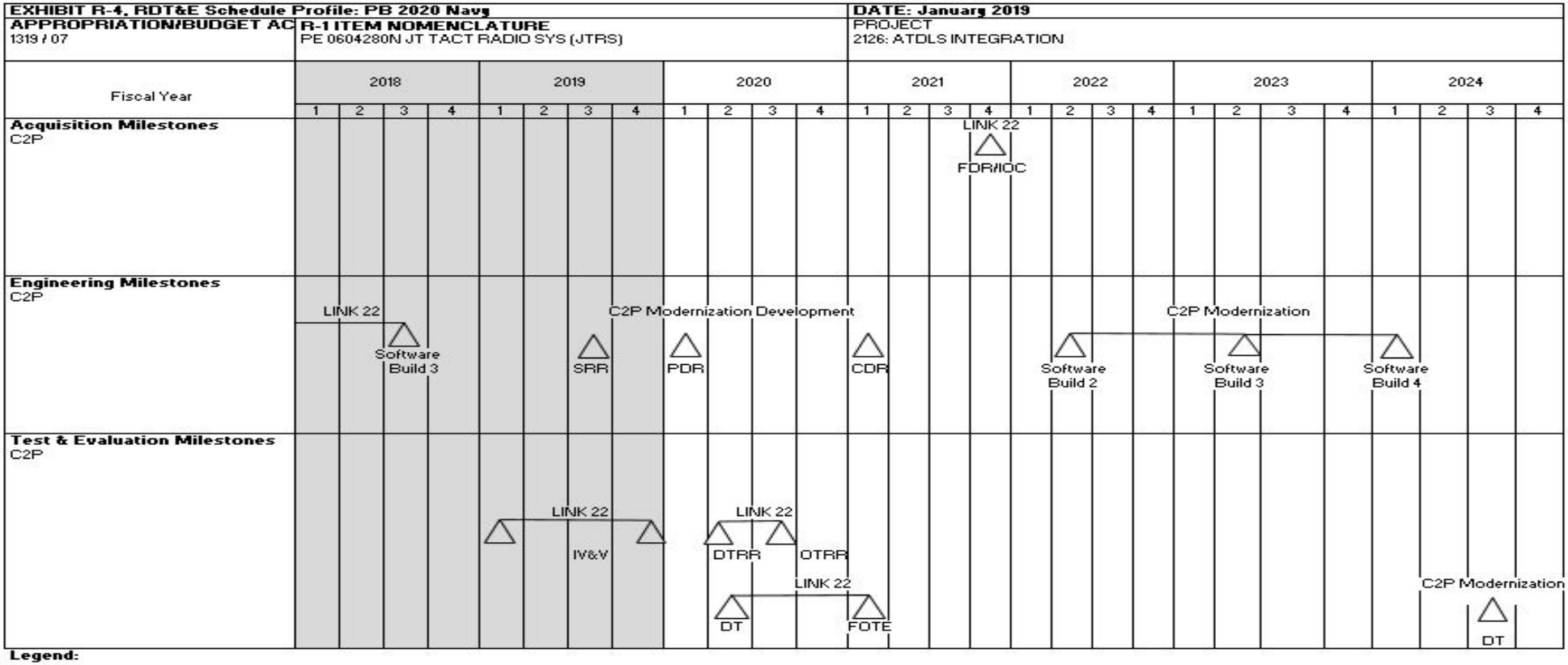



**Legend:**

CM - Cryptographic Modernization
DNM - Dynamic Network Management
DT - Developmental Test
DTRR - Developmental Test Readiness Review
FDR - Fielding Decision Review
FOC - Full Operating Capability
FOT&E - Follow-on Operational Test & Evaluation
FR - Frequency Remapping
IOC - Initial Operating Capability
IT - Integrated Test
ITRR - Integrated Test Readiness Review
IV&V - Independent Verificaiton and Validation
JTIDS - Joint Tactical Information Distribution System
MOS - MIDS On Ship
MOS MOD - MOS Modernization
OT - Operational Test
OTRR - Operational Test Readiness Review
PRR - Production Readiness Review
TRR - Test Readiness Review

FY18 and FY19 funding was provided under PE 0205604N Project 2126

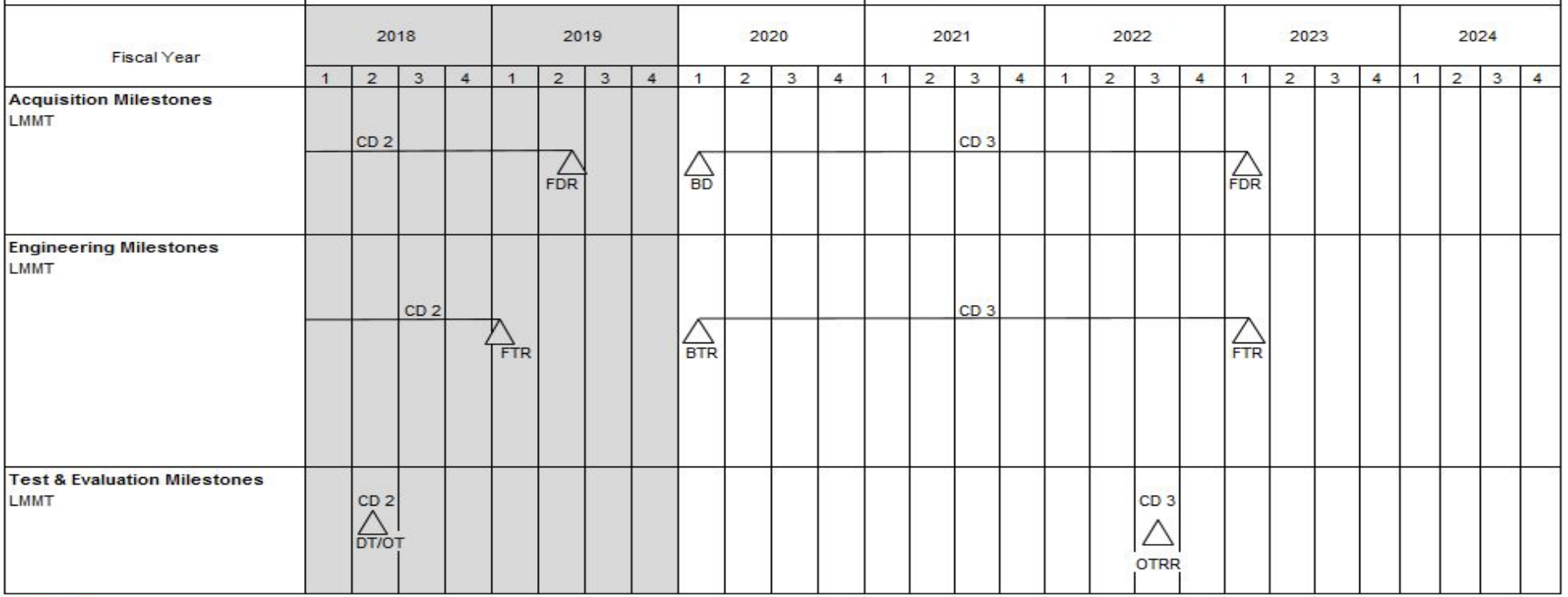
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |




FY18 and FY19 funding was provided under PE 0205604N Project 2126

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

| EXHIBIT R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: January 2019 |
|---|---|---|
| APPROPRIATION/BUDGET ACTIVITY<br>1319 / 07 | R-1 ITEM NOMENCLATURE<br>PE 0604280N JT TACT RADIO SYS (JTRS) | PROJECT<br>2126: ATDLS INTEGRATION |




**Legend:**

| | | | | |
|---|---|---|---|---|
| BD - Build Decision | CD - Capability Drop | FDR - Fielding Decision Review | FTR - Fielding Technical Review | OT - Operational Test |
| BTR - Build Technical Review | DT - Developmental Test | FOC - Full Operational Capability | IOC - Initial Operating Capability | OTRR - Operational Test Readiness Review |

FY18 and FY19 funding was provided under PE 0205604N Project 2126

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2126*** | | | | |
| C2P Modernization Development Preliminary Design Review | 1 | 2020 | 1 | 2020 |
| LMMT CD 3 Build Decision | 1 | 2020 | 1 | 2020 |
| LMMT CD 3 Build Technical Review | 1 | 2020 | 1 | 2020 |
| Link 16 MOS Mod with CMN Terminal Developmental Test Readiness Review | 2 | 2020 | 2 | 2020 |
| Link 16 MOS Mod with CMN Terminal Developmental Test | 2 | 2020 | 2 | 2020 |
| C2P Link 22 Developmental Test Readiness Review | 2 | 2020 | 2 | 2020 |
| C2P Link 22 Developmental Test | 2 | 2020 | 2 | 2020 |
| Link 16 MOS Mod Production Readiness Review | 3 | 2020 | 3 | 2020 |
| Link 16 MOS Mod Fielding Decision Review / Initial Operating Capability | 3 | 2020 | 3 | 2020 |
| Link 16 JTIDS CM/FR Fielding Decision Review / Initial Operating Capability | 3 | 2020 | 3 | 2020 |
| Link 16 MOS CM/FR Fielding Decision Review / Initial Operating Capability | 3 | 2020 | 3 | 2020 |
| C2P Modernization Development Critical Design Review | 1 | 2021 | 1 | 2021 |
| C2P Link 22 Operational Test Readiness Review | 3 | 2020 | 3 | 2020 |
| C2P Link 22 Follow on Test and Evaluation | 1 | 2021 | 1 | 2021 |
| LMMT CD 3 Operational Test Readiness Review | 3 | 2021 | 3 | 2021 |
| Link 16 CMN Development Test Readiness Review | 4 | 2021 | 4 | 2021 |
| Link 16 CMN Development Test | 4 | 2021 | 4 | 2021 |
| C2P Link 22 Fielding Decision Review / Initial Operating Capability | 4 | 2021 | 4 | 2021 |
| C2P Modernization Software Build 2 | 2 | 2022 | 2 | 2022 |
| LMMT CD 3 Fielding Technical Review | 1 | 2023 | 1 | 2023 |
| LMMT CD 3 Fielding Decision Review | 1 | 2023 | 1 | 2023 |
| C2P Modernization Software Build 3 | 2 | 2023 | 2 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>2126 / *ATDLS Integration* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| C2P Modernization Build 4 | 1 | 2024 | 1 | 2024 |
| C2P Modernization Development Test | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | | | | Project (Number/Name)<br>3020 / *MIDS/JTRS* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3020: *MIDS/JTRS* | 0.000 | 0.000 | 0.000 | 39.214 | - | 39.214 | 31.198 | 29.480 | 30.515 | 31.673 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |
| **Project MDAP/MAIS Code:** 554 | | | | | | | | | | | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0205604N Project 3020 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The Multifunctional Information Distribution System (MIDS) program office is the Lead Service for Department of Defense (DOD) Link 16 capability and consists of two (2) product lines, MIDS Low Volume Terminal (LVT) (legacy hardware defined radio) and MIDS Joint Tactical Radio System (JTRS) (software defined radio). MIDS-LVT effort is a cooperative development program between France, Germany, Italy, Spain, and the United States with United States joint service participation (Navy, Army, Air Force), and has provided over 11,000 terminals to 48 Nations providing interoperability with North Atlantic Treaty Organization (NATO) and coalition partners. The Department of Defense (DoD) established the program to design, develop, and deliver low volume, lightweight tactical information system terminals for U.S. and allied fighter aircraft, bombers, helicopters, ships, and ground sites. MIDS-LVT significantly increases force effectiveness and minimizes hostile actions and friend-on-friend engagements. MIDS-LVT Block Upgrade 2 was executed as an ECP and provides the critical upgrades to the MIDS-LVT Terminal to enable U.S., Coalition and International partners' ability to meet the National Security Agency (NSA) mandated timelines for Cryptographic Modernization (CM) and the National Telecommunications and Information Agency (NTIA) and Federal Aviation Agency (FAA) mandated timelines for Frequency Remapping (FR).

MIDS JTRS, designed as a Pre-Planned Product Improvement (P3I) and executed as an Engineering Change Proposal (ECP) to the production MIDS-LVT configuration, and is fully compatible with MIDS-LVT. The MIDS JTRS Core Terminal achieved Full Fielding & Production (FP&F) in March 2012. It facilitated the JTRS incremental approach for fielding advanced JTRS transformational networking capability and transformed the MIDS-LVT into a 4-channel, Software Communications Architecture (SCA) compliant, Joint Tactical Radio. A form-fit-function replacement to MIDS-LVT, MIDS JTRS also adds three programmable 2 Megahertz (MHz) to 2 Gigahertz (GHz) channels capable of hosting the JTRS legacy and networking waveforms. In addition to Link 16, Tactical Air Navigation (TACAN), and voice functionality found in MIDS-LVT, MIDS JTRS has four channels and adds capabilities such as Link 16 Enhanced Throughput (ET), Link 16 FR, software programmability, CM, and Four Net Concurrent Multi-Netting with Concurrent Contention Receive (CMN-4).

MIDS JTRS Tactical Targeting Network Technology (TTNT), is a block upgrade to the MIDS JTRS CMN-4 Terminal provides an Internet Protocol-based networking capability on tactical aircraft. TTNT is a low latency, high throughput waveform that has the capability to support data exchange between fast-moving tactical aircraft, weapons, and unmanned aircraft, in addition to air, land, and sea-based command and control nodes, in a variety of air-to-air and air-to-ground missions including time sensitive targeting, air warfare, close air support, non-traditional ISR, and anti-surface warfare. TTNT capability integration into the MIDS JTRS directly supports Naval Integrated Fire Control (NIFC) capability requirements. These capabilities provide Joint Airborne Network-Tactical Edge functionality to run advanced mission applications in a cross-platform/cross-domain tactical network enterprise.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3020 / *MIDS/JTRS* |

The FY20 Budget continues the development of the MIDS JTRS Link 16 transceiver hardware upgrade (formerly MIDS Modernization) to allow for field loadable updates. FY20 will include the Link 16 hardware Critical Design Review, Technical Readiness Review and the completion of the MIDS JTRS TTNT testing as well as the updates to the TTNT and Link 16 waveforms.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** MIDS | 0.000 | 0.000 | 39.214 | 0.000 | 39.214 |
| ***Articles:*** | - | - | - | - | - |

***FY 2019 Plans:***
FY19 Plans funded under PE 0205604N, Project 3020

***FY 2020 Base Plans:***
Continue the MIDS JTRS Link 16 hardware transceiver upgrade development efforts (MIDS Modernization). Conduct a Critical Design Review post Preliminary Design Review (PDR) and PDR updates, perform Technology Readiness Review and kick off Contractor First Article Qualification testing. Port the Block Cycle 3 software into the new upgraded Link 16 hardware transceiver.

Continue MIDS JTRS Tactical Targeting Network Technology (TTNT) testing and platform integration efforts to include full development contract and Problem Report fixes. Complete MIDS JTRS TTNT Government First Article Qualification Testing, Developmental Testing, and initiate Limited Production Award.

Begin Consolidated Automated Support System (CASS) Test Program Sets (TPS) efforts for the MIDS JTRS TTNT terminal.

Continue MIDS systems engineering, communication security, IA and program management support.

Continue with Link 16 Waveform development fixes and updates.

***FY 2020 OCO Plans:***
N/A

***FY 2019 to FY 2020 Increase/Decrease Statement:***
In FY19 funding under PE 0205604N, Project 3020 was $43.798 million. Funding decreases by $4.584 million to $39.214 million in FY20. MIDS RDTE funding decrease attributed to the completion of the full development of the Tactical Targeting Network Technology (TTNT) contract. TTNT testing and platform integration continues but the main development effort completes in FY19 decreasing TTNT's funding from FY19 to FY20. FY20 budget

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3020 / *MIDS/JTRS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| supports MIDS JTRS Link 16 transceiver hardware upgrade to include the porting of the Link 16 waveform to the new hardware and the Block Cycle 3 software into the new hardware. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 39.214 | 0.000 | 39.214 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0205604N/3020: *MIDS/JTRS* | 38.876 | 43.798 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 389.267 |

**Remarks**

**D. Acquisition Strategy**

Multifunctional Information Distribution System Joint Tactical System (MIDS JTRS) development was initiated as a major modification to the MIDS-LVT using an Engineering Change Proposal to the existing production contracts. The U.S. prime contractors from the MIDS-LVT program, Data Link Solutions (DLS) and Viasat Inc., cooperatively designed and developed each of the MIDS JTRS terminal variants and Block Upgrade 2 for MIDS-LVT. The U.S. implemented a continuous competition strategy between DLS and ViaSat that will be maintained throughout the MIDS-LVT and MIDS JTRS production phases. This strategy has been successfully used on all MIDS variants.

**E. Performance Metrics**

The MIDS-LVT and MIDS JTRS programs are employing mature, software-defined radio technologies and developing hundreds of thousands of lines of code. These software metrics are used to quantify the quality and progress of each software product's development over time. MIDS employs earned value metrics to monitor contract performance on its prime development contracts, as required.

MIDS-LVT: The 11 performance measures are: Link 16 Waveform Compatibility, Link 16 Message Standards, Link 16 IER; Interoperability, Link 16 Coded Error Message Probability, Weight/Volume, Link 16 JAM Resistance, Link 16 Voice Channels, Link 16 Communication Range Data, Link 16 Communications Range Voice, Link 16 Relay.

MIDS JTRS: The 15 performance measures are: Link 16 Waveform Compatibility, Link 16 Waveform Standards, Link 16 Coded Error Message Probability, Link 16 Jamming Resistance, Link 16 Communication Range-Data, Link 16 Communications Range-Voice, Link 16 Relay, Start-up (Terminal Single Channel), Operational Communications - Passive Synchronization, Operational Communications - Automatic Message Acknowledgement, Operational Communications - Multi-Net, Operational Communications, Crypto Control, Navigation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3020 / *MIDS/JTRS* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Link 16 Waveform Development | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.775 | Nov 2019 | - | | 0.775 | Continuing | Continuing | Continuing |
| TTNT Post Development Problem Report Fixes | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.330 | Dec 2019 | - | | 0.330 | Continuing | Continuing | Continuing |
| TTNT Reliability Growth | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 1.100 | Jan 2020 | - | | 1.100 | Continuing | Continuing | Continuing |
| MIDS JTRS Link 16 Hardware Upgrade | C/CPFF | DLS : Cedar Rapids, IA | 0.000 | 0.000 | | 0.000 | | 18.121 | Nov 2019 | - | | 18.121 | Continuing | Continuing | Continuing |
| MIDS JTRS Link 16 Hardware Upgrade | C/CPFF | Viasat : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 12.488 | Nov 2019 | - | | 12.488 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 32.814 | | - | | 32.814 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSS TPS | WR | NAVAIR : North Island San Diego, CA | 0.000 | 0.000 | | 0.000 | | 2.791 | Jan 2020 | - | | 2.791 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.791 | | - | | 2.791 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JTEL | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.205 | Dec 2019 | - | | 0.205 | Continuing | Continuing | Continuing |
| JTEL Testing Support | C/CPFF | G2 : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.095 | Mar 2020 | - | | 0.095 | Continuing | Continuing | Continuing |
| COMOPTEVFOR Testing | MIPR | COMOPTEVFOR : Norfolk, VA | 0.000 | 0.000 | | 0.000 | | 0.150 | Jan 2020 | - | | 0.150 | 0.000 | 0.150 | - |
| TTNT DT/OT Support | WR | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 1.600 | Nov 2019 | - | | 1.600 | 0.000 | 1.600 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.050 | | - | | 2.050 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3020 / *MIDS/JTRS* | |

**Management Services ($ in Millions)**

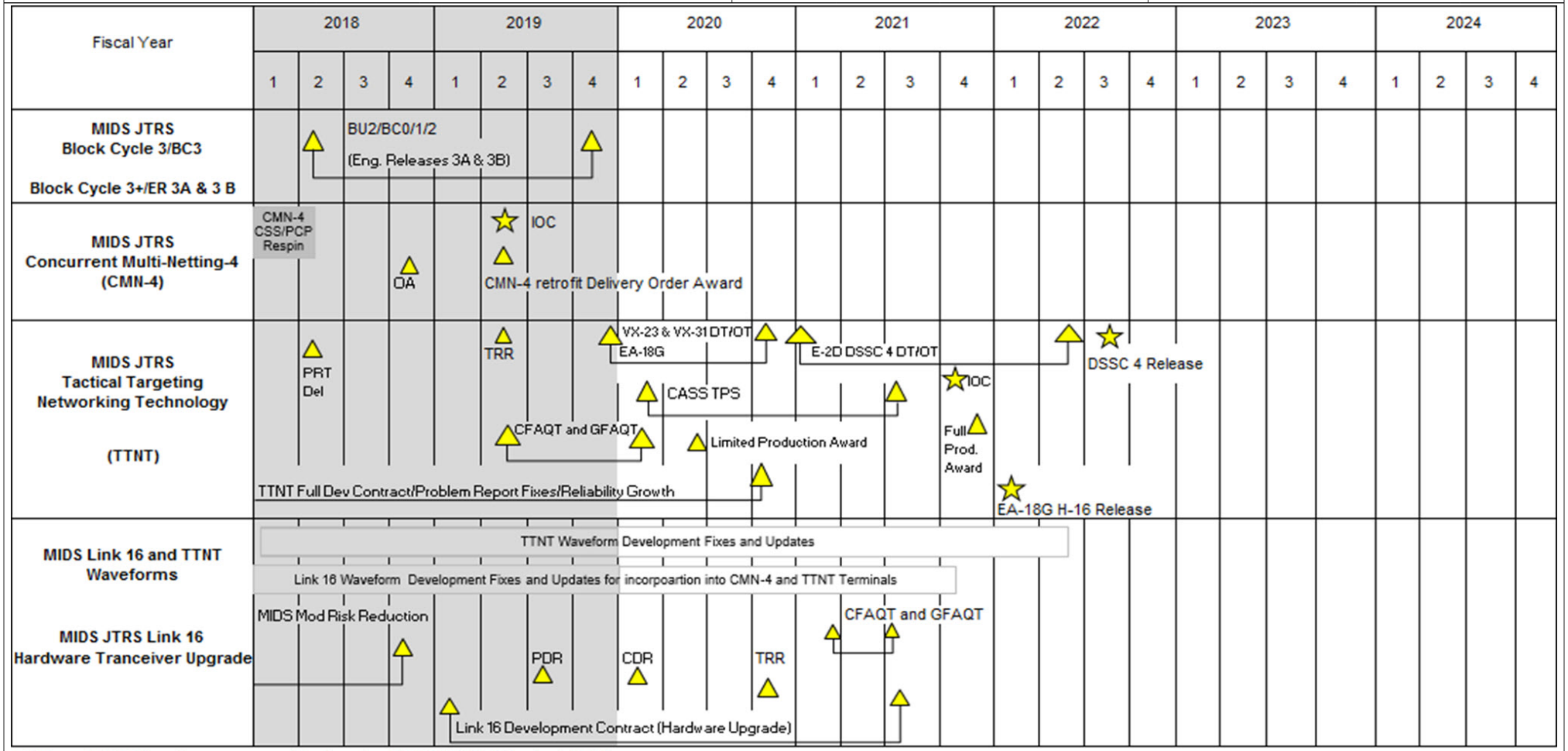
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering Support | MIPR | MITRE : Bedford, MA | 0.000 | 0.000 | | 0.000 | | 1.000 | Dec 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | SSC PAC : San Diego,CA | 0.000 | 0.000 | | 0.000 | | 0.259 | Nov 2019 | - | | 0.259 | Continuing | Continuing | Continuing |
| Information Assurance | MIPR | CERDEC : Aberdeen Proving Ground, MD | 0.000 | 0.000 | | 0.000 | | 0.300 | Dec 2019 | - | | 0.300 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.559 | | - | | 1.559 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 39.214 | | - | | 39.214 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0205604N Project 3020

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3020 / *MIDS/JTRS* |




**FY18 and FY19 funding was provided under PE 0205604N Project 3020**

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3020 / *MIDS/JTRS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3020*** | | | | |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): CFAQT and GFAQT | 1 | 2020 | 1 | 2020 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): VX-23 & VX-31 Developmental Test (DT) and Operational Test (OT) EA-18G | 1 | 2020 | 4 | 2020 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): Problem Report Fixes/ Reliability Growth Contract | 1 | 2020 | 4 | 2020 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): Consolidated Automated Support System (CASS) Test Program Sets (TPS) | 1 | 2020 | 3 | 2021 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): Limited Production Award | 2 | 2020 | 2 | 2020 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): E-2D DSSC 4 DT/OT | 1 | 2021 | 2 | 2022 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): Full Production Award | 4 | 2021 | 4 | 2021 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): Initial Operating Capability | 4 | 2021 | 4 | 2021 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): EA-18G H16 Release | 1 | 2022 | 1 | 2022 |
| MIDS JTRS Tactical Targetting Network Technology (TTNT): DSSC 4 Release | 3 | 2022 | 3 | 2022 |
| MIDS Link 16 and TTNT Waveforms: TTNT Waveform Development Fixes and Updates | 1 | 2020 | 2 | 2022 |
| MIDS Link 16 and TTNT Waveforms: Link 16 Waveform Development Fixes and Updates | 1 | 2020 | 4 | 2021 |
| MIDS JTRS Link 16 Hardware Transceiver Upgrade: Development Contract | 1 | 2020 | 3 | 2021 |
| MIDS JTRS Link 16 Hardware Transceiver Upgrade: Critical Design Review | 1 | 2020 | 1 | 2020 |
| MIDS JTRS Link 16 Hardware Transceiver Upgrade: Technology Readiness Review | 4 | 2020 | 4 | 2020 |
| MIDS JTRS Link 16 Hardware Transceiver Upgrade: Contractor and Government First Article Qualification Test (CFAQT and GFAQT) | 1 | 2021 | 2 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3078 / *Digital Modular Radio* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3078: *Digital Modular Radio* | 41.173 | 5.172 | 3.272 | 3.262 | - | 3.262 | 3.000 | 3.016 | 6.422 | 6.550 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Digital Modular Radio (DMR) with Integrated Waveform (IW) and Mobile User Objective System (MUOS) capable hardware is the Navy's technical solution for the IW/ MUOS requirement. The DMR AN/USC-61(C), is the first software defined radio to become a communications system standard for the U.S. Military. The compact, multi-channel DMR provides multiple waveforms and multi-level information security for voice and data communications. DMR radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense (DoD) communication platforms using frequencies ranging from 2 MHz to 2 GHz. Certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), and Satellite Communications (SATCOM) channels, the DMR system was developed to the U.S. Navy's specifications and meets all the stringent environmental, Electromagnetic Interference (EMI) and performance requirements for use in the U.S. Fleet. This program is for continued development/integration of the IW and MUOS waveforms into the DMR in accordance with Military Standards 188-181,2,3. Additionally, the enhancements of High Frequency Distribution Amplifier Group (HFDAG) and HF Automated Link Establishment (ALE) will also be developed/integrated into the DMR. HFDAG is a follow-on HF solution to fulfill transmit and receive HF communication capability with various modes of operation, such as ALE, for Navy platforms. HFDAG will utilize the existing DMR as the exciter/receiver. Generation 3 (GEN 3) HF ALE/HF wideband provides Navy users with improved HF communications, increased transmission rates from radio to radio, and serves as a supplement to SATCOM when SATCOM networks are overloaded or unavailable. IW uses a Time Division Multiple Access (TDMA) communication system in an attempt to improve satellite bandwidth utilization over legacy SATCOM waveforms. This enables demand assigned services on UHF SATCOM networks to support new applications that require better performance and higher channel throughput. The MUOS waveform will enable MUOS satellites to provide worldwide communication satellite coverage for DoD requirements. MUOS will provide functionality comparable to commercial mobile phone systems.

FY 2020 DMR will complete an assessment and test of the Military Standard mandated MUOS scanning requirements, develop a scanning Concept of Operations (CONOPS), and continue development of updated DMR Cryptographic Equipment Application (CEA) software to be compliant with the latest National Security Agency (NSA) cryptographic modernization specifications.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** DMR | 5.172 | 3.272 | 3.262 | 0.000 | 3.262 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion. DMR is the Navy's primary solution for providing the UHF SATCOM IW and MUOS waveform to the Fleet. | | | | | |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3078 / *Digital Modular Radio* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete at-sea Program Developmental Testing (DT) of the IW/MUOS waveforms into the DMR system. Conduct a Government Run for Record in support of HF ALE software. Complete the development of DMR HF ALE GEN3 software efforts and Joint Integration Test Command (JITC) interoperability certification. Receive HF ALE GEN3 software drop from vendor for testing and RRR efforts. Provide engineering support services for reviewing cryptographic modernization specifications and evaluating the current DMR cryptographic capability to ensure integration with new and legacy Cryptographic Equipment Application (CEA).<br>***FY 2020 Base Plans:***<br>Conduct HF ALE GEN3 lab testing. Complete an assessment and test of the Military Standard mandated MUOS scanning requirement for DMR. Develop a DMR technical solution and concept of operations (CONOPS) for meeting the Military Standard mandated MUOS scanning requirement. Develop and update software to ensure DMR Cryptographic Equipment Application (CEA) is compatible with National Security Administration certified software. Continue to provide engineering support services for cryptographic modernization specifications and evaluating the current DMR cryptographic capability to ensure integration with new and legacy CEA.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding does not appreciably change from FY19 to FY20. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 5.172 | 3.272 | 3.262 | 0.000 | 3.262 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/3010: *DMR OPN* | 23.695 | 45.450 | 55.853 | - | 55.853 | 61.870 | 65.792 | 61.409 | 62.637 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

General Dynamics Mission Systems (GDMS), formerly General Dynamics C4 Systems (GDC4S), owns the technical data rights to the DMR. Due to this fact, they are the only contractor with the unique capabilities and technical know-how to perform the required design work to complete the Integrated Waveform (IW) upgrade, the Mobile User Objective System (MUOS) interoperability efforts, and cryptographic modernization development.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3078 / *Digital Modular Radio* |

**E. Performance Metrics**

Military Standard (MIL-STD) conformance to meet Joint Integration Test Command (JITC) certification for High Frequency Amplifier Link Establishment (HF ALE) waveform.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3078 / *Digital Modular Radio* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IW/MUOS Development | C/CPIF | GDMS : Scottsdate, AZ | 21.232 | 3.439 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.671 | - |
| HF ALE Development | C/CPIF | GDMS : Scottsdale, AZ | 7.646 | 0.702 | Oct 2017 | 1.965 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 10.313 | - |
| IW/MUOS Development | WR | SSC PAC : San Diego, CA | 0.600 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.600 | - |
| HF ALE Development | WR | SSC PAC : San Diego, CA | 0.242 | 0.127 | Oct 2017 | 0.130 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.499 | - |
| Cryptographic Modernization Development | C/CPIF | GDMS : Scottsdale, AZ | 0.000 | 0.000 | | 0.259 | Apr 2019 | 1.693 | Oct 2019 | - | | 1.693 | Continuing | Continuing | Continuing |
| Cryptographic Modernization Development | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.400 | Dec 2019 | - | | 0.400 | Continuing | Continuing | Continuing |
| MUOS Scanning | C/CPIF | GDMS : Scottsdale, AZ | 0.000 | 0.000 | | 0.000 | | 0.150 | Jan 2020 | - | | 0.150 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 29.720 | 4.268 | | 2.354 | | 2.243 | | - | | 2.243 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering Support | Various | SSC PAC : San Diego, CA | 6.561 | 0.556 | Nov 2017 | 0.565 | Dec 2018 | 0.515 | Dec 2019 | - | | 0.515 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.561 | 0.556 | | 0.565 | | 0.515 | | - | | 0.515 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Testing | Various | SSC PAC : San Diego, CA | 2.196 | 0.130 | Feb 2018 | 0.298 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.624 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3078 / *Digital Modular Radio* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JITC Testing | WR | JITC : Ft. Huachuca, AZ | 0.330 | 0.139 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.469 | - |
| Interoperability Testing | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.150 | Nov 2019 | - | | 0.150 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.248 | Nov 2019 | - | | 0.248 | Continuing | Continuing | Continuing |
| Certification Authorization | WR | NSA : Ft. Meade, MD | 0.000 | 0.030 | Apr 2018 | 0.000 | | 0.050 | Jan 2020 | - | | 0.050 | 0.000 | 0.080 | - |
| | | **Subtotal** | 2.526 | 0.299 | | 0.298 | | 0.448 | | - | | 0.448 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

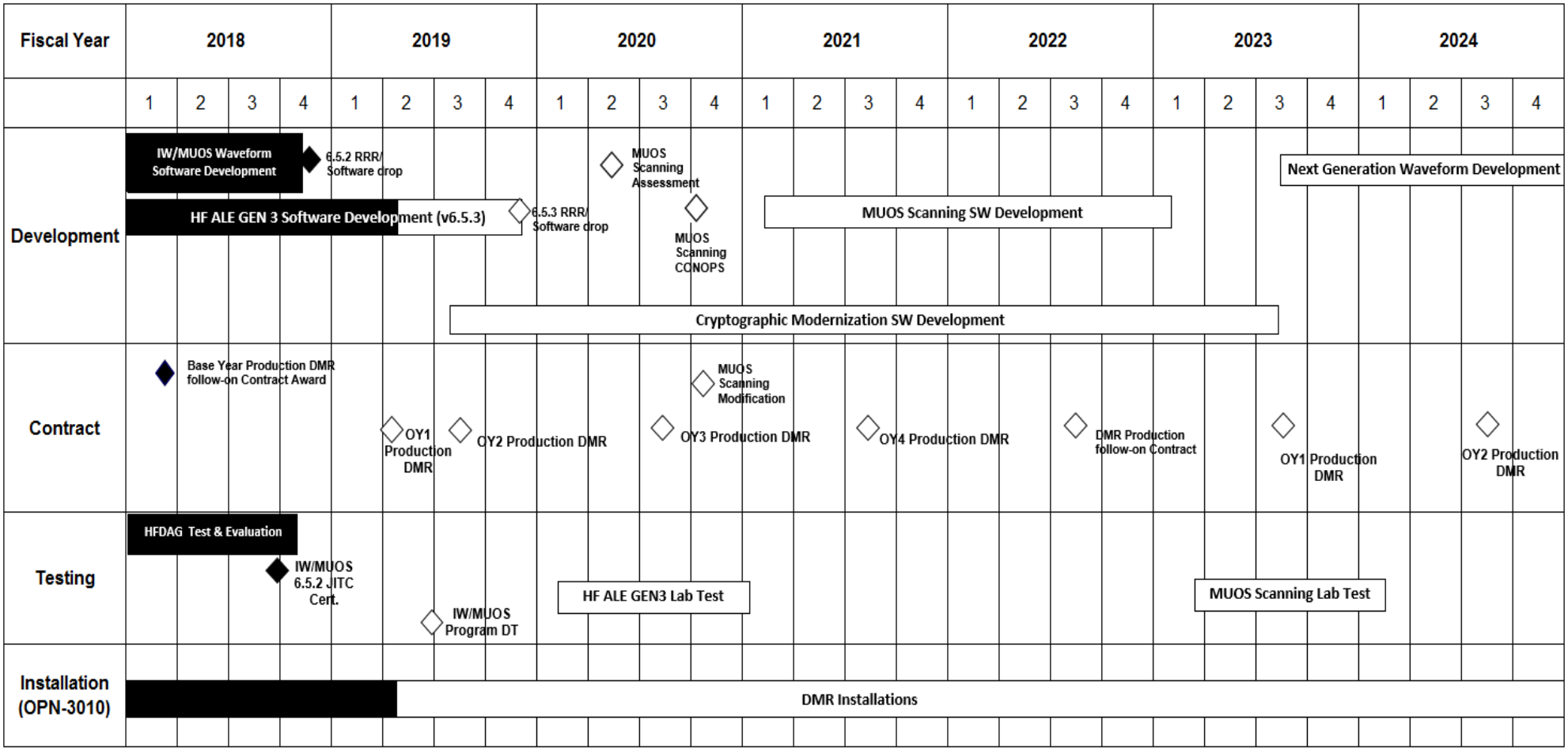
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | BAH : San Diego, CA | 2.366 | 0.049 | Feb 2018 | 0.055 | Nov 2018 | 0.056 | Nov 2019 | - | | 0.056 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.366 | 0.049 | | 0.055 | | 0.056 | | - | | 0.056 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 41.173 | 5.172 | | 3.272 | | 3.262 | | - | | 3.262 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3078 / *Digital Modular Radio* |

## DMR



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3078 / *Digital Modular Radio* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3078*** | | | | |
| IW Development | 1 | 2018 | 4 | 2018 |
| MUOS Waveform Development | 1 | 2018 | 4 | 2018 |
| HFDAG Test and Evaluation | 1 | 2018 | 4 | 2018 |
| HF ALE GEN 3 Software Development | 1 | 2018 | 4 | 2019 |
| Production Deliveries | 1 | 2018 | 4 | 2024 |
| DMR Installations | 1 | 2018 | 4 | 2024 |
| MUOS Release Requirements Review Software Drop (v6.5.2) | 4 | 2018 | 4 | 2018 |
| IW/MUOS JITC Certification (v6.5.2) | 3 | 2018 | 3 | 2018 |
| IW/MUOS Program Development Testing (DT) | 3 | 2019 | 3 | 2019 |
| Cryptographic Modernization SW Development | 3 | 2019 | 3 | 2023 |
| HF ALE GEN 3 Release Requirements Review Software Drop (v6.5.3) | 4 | 2019 | 4 | 2019 |
| HF ALE GEN 3 Lab Test | 1 | 2020 | 1 | 2021 |
| MUOS Scanning Assessment | 2 | 2020 | 2 | 2020 |
| MUOS Scanning CONOPS | 4 | 2020 | 4 | 2020 |
| MUOS Scanning Modification | 4 | 2020 | 4 | 2020 |
| MUOS Scanning Software Development | 1 | 2021 | 1 | 2023 |
| MUOS Scanning Lab Test | 1 | 2023 | 1 | 2024 |
| Next GEN Waveform Development | 3 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3341 / *Network Tactical Common Data Link* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3341: *Network Tactical Common Data Link* | 0.000 | 0.000 | 0.000 | 32.432 | - | 32.432 | 35.837 | 7.861 | 6.156 | 6.279 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604280N from PE 0205604N Project 3341 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $4.576 million due to the availability of prior year execution balances.

Network Tactical Common Data Link (NTCDL) provides the ability to transmit/receive real-time Intelligence, Surveillance, and Reconnaissance (ISR) data simultaneously from multiple sources (surface, airborne, sub-surface, man-portable), and exchange command and control information (voice, data, imagery, and Full Motion Video) across dissimilar joint, service, coalition, and civil networks. NTCDL provides warfighters with the capability to support multiple, simultaneous, networked operations with currently fielded Common Data Link (CDL)-equipped air platforms (e.g. F/ A-35, P-3, and MH-60R), in addition to next generation manned and unmanned platforms (e.g., P-8, Triton, MQ-25 (Stingray), small tactical unmanned aircraft systems (STUAS) and Fire Scout). NTCDL is an incremental capability (surface, airborne, sub-surface, man-portable) providing modular, scalable, multiple-link networked communications. NTCDL benefits the fleet by providing a horizon extension for line-of-sight sensor systems for use in time-critical strike missions and supports tasking, collection, processing, exploitation, and dissemination (TCPED) via its ISR networking capability. NTCDL supports Resilient Command and Control (RC2) through its relay capability, and supports TCPED through its ISR networking capability.

FY 2020 request is for NTCDL product development, to include continued development of two (2) NTCDL Engineering Development Models (EDMs) and associated software.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Network Tactical Common Data Link (NTCDL) | 0.000 | 0.000 | 32.432 | 0.000 | 32.432 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** NTCDL is the only High Data Rate (HDR), Line of Sight (LOS) solution delivering Intelligence, Surveillance, and Reconnaissance (ISR), sensor control information and unmanned aircraft system (UAS) command and control. NTCDL uses Joint Department of Defense specifications for Common Data Link (CDL) waveforms and LOS networks across the allocated CDL frequency spectrum. New technical specifications require increasing number of simultaneous CDL links to support increasing number of CDL/ISR platforms and missions. The software for NTCDL is developed by both contractor and government. The contractor software | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3341 / *Network Tactical Common Data Link* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|

development is responsible for the internal control of the NTCDL hardware whereas the Government Furnished Software (GFS) is responsible for interfacing with various external networks (e.g. Automated Digital Network System (ADNS)) and users (e.g. Consolidated Afloat Networks and Enterprise Services (CANES)). EDM development is a multi-year effort with delivery planned in FY 2021.

***FY 2019 Plans:***
FY19 Plans funded under PE 0205604N, Project 3341

***FY 2020 Base Plans:***
FY 2020 plans include the continued development, integration, and test of the Engineering Development Models (EDMs) and the contractor-developed Link Control Subsystem (LCS) software, as well as the continuation of Government Furnished Software (GFS). Begin integration of multiple subsystems to include: Phased Array Antenna (PAA), X/Ku-band dish antenna, End Cryptographic Unit (ECU), Below Deck Equipment (BDE) racks, and radio terminals. Conduct subsystem testing, Joint Interoperability Test Command (JITC) CDL waveform compliance testing, attain National Security Agency (NSA) Type 1 certification of ECU, and Test Readiness Review (TRR). Commence installation planning efforts in support of FY 2021 EDM delivery. Complete documentation development to include subsystem Interface Design Description (IDD), Installation Requirements Drawings (IRD), Communication Security (COMSEC) certification documents, Electromagnetic Interference (EMI) test and Electromagnetic Environmental Effects (E3) integration and analysis report, spectrum certification, Safety Assessment Report (SAR), and health hazard analysis. Conduct end-to-end system testing. Completion of incremental capability of government developed software will include integration with contractor hardware and software. Develop software documentation to include Software Version Description (SVD), Software Test Plan / Description (STP/D), Requirement Traceability Matrix (RTM), and Software User Manual (SUM). Conduct a Field Technical Release (FTR) for delivery of GFS incremental capability. Complete the Risk Management Framework (RMF) process in support of cybersecurity requirements and complete Interim Authorization To Test (IATT).

***FY 2020 OCO Plans:***
N/A

***FY 2019 to FY 2020 Increase/Decrease Statement:***
In FY19 funding under PE 0205604N, Project 3341 was $13.886 million. The FY 2020 funding request was reduced by $4.576 million due to the availability of prior year execution balances. Funding increases by $18.546 million to $32.432 million in FY20. The increase from FY19 to FY20 provides for continued development of two (2) NTCDL EDMs and associated software, Government Furnished Software (GFS) development, contractor-

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3341 / *Network Tactical Common Data Link* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| developed software development, and systems engineering in addition to maintaining the current FY21 EDM delivery schedule. Furthermore, this increase supports $15.0 million of contractor hardware buys and installation subtasks. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 32.432 | 0.000 | 32.432 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2950: *NTCDL* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 20.052 | 20.456 | 20.865 | Continuing | Continuing |
| • RDTEN/0205604N/3341: *Network Tactical Common Data Link* | 15.135 | 13.886 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 82.754 |

**Remarks**

**D. Acquisition Strategy**

NTCDL will utilize the evolutionary acquisition approach for: surface, air, sub-surface, man-portable.

**E. Performance Metrics**

Conformance to meet Joint Interoperability Test Command (JITC) Certification requirements for CDL waveforms.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3341 / *Network Tactical Common Data Link* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NTCDL Product Development | C/CPIF | BAE Systems, Int : Wayne, NJ | 0.000 | 0.000 | | 0.000 | | 24.326 | Oct 2019 | - | | 24.326 | Continuing | Continuing | Continuing |
| NTCDL Software Development | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.901 | Nov 2019 | - | | 1.901 | Continuing | Continuing | Continuing |
| NTCDL Software Development | WR | Technology Unlimited Group : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.257 | Nov 2019 | - | | 1.257 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 27.484 | | - | | 27.484 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NTCDL Systems Engineering | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.915 | Nov 2019 | - | | 1.915 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.915 | | - | | 1.915 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NTCDL Test and Evaluation | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.260 | Nov 2019 | - | | 1.260 | Continuing | Continuing | Continuing |
| NTCDL Test and Review | MIPR | JITC : Fort Huachuca, AZ | 0.000 | 0.000 | | 0.000 | | 0.209 | Dec 2019 | - | | 0.209 | Continuing | Continuing | Continuing |
| NTCDL Waveform Certification | MIPR | COMOPTEVFOR : Norfolk, VA | 0.000 | 0.000 | | 0.000 | | 0.164 | Dec 2019 | - | | 0.164 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.633 | | - | | 1.633 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>3341 / *Network Tactical Common Data Link* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NTCDL Program Management Support | C/CPFF | BAH : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.400 | Nov 2019 | - | | 1.400 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.400 | | - | | 1.400 | Continuing | Continuing | N/A |

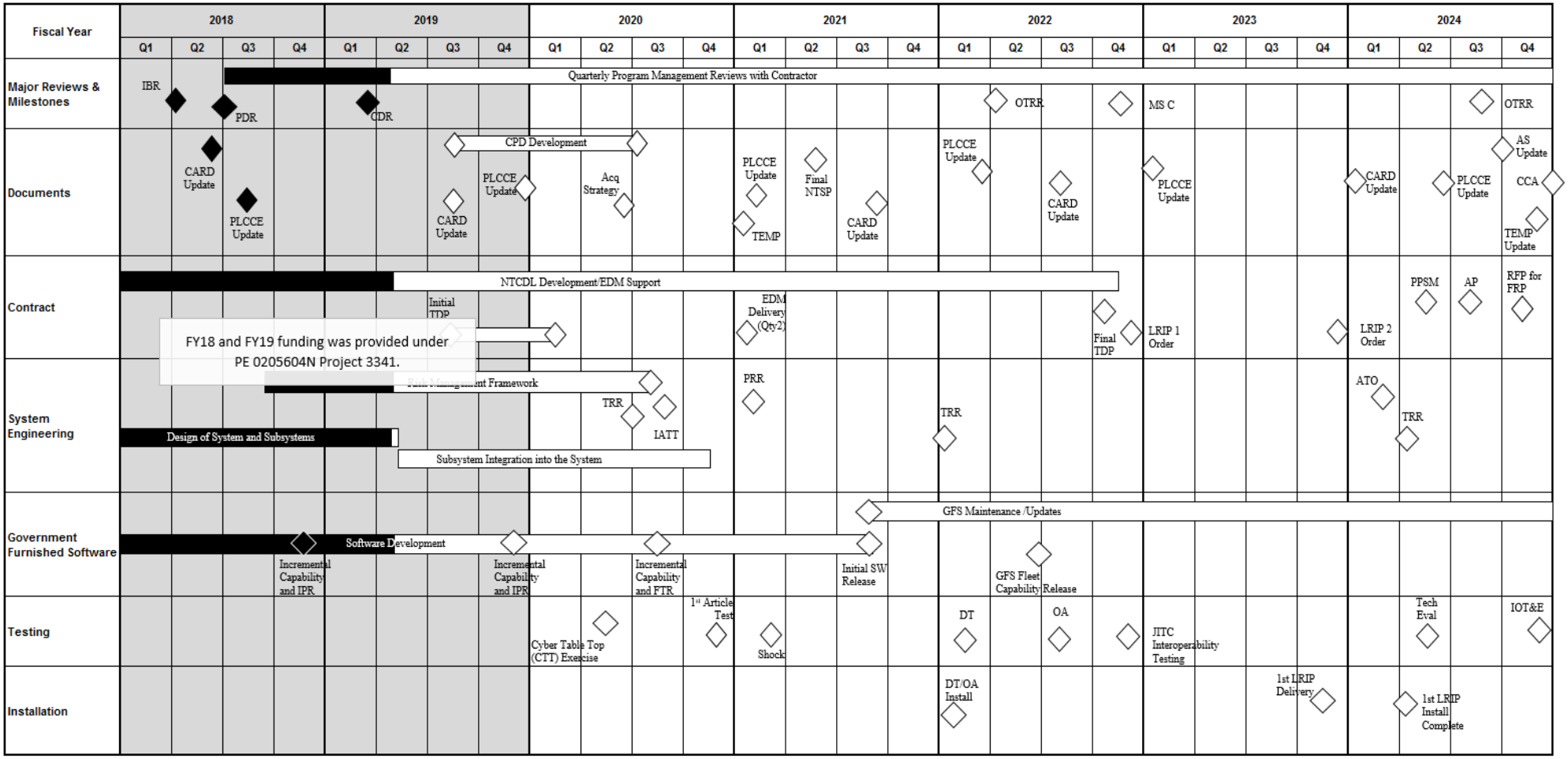
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 32.432 | | - | | 32.432 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data for NTCDL is provided under PE 0604280N, Project 3341.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3341 / *Network Tactical Common Data Link* |

NTCDL



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3341 / *Network Tactical Common Data Link* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3341*** | | | | |
| Government Furnished Software (GFS) Development | 1 | 2020 | 3 | 2021 |
| Development Contract | 1 | 2020 | 4 | 2022 |
| Risk Management Framework (RMF) | 1 | 2020 | 3 | 2020 |
| Quarterly Program Management Review with Contractor | 1 | 2020 | 4 | 2024 |
| Subsystem Integration into the System | 1 | 2020 | 4 | 2020 |
| Initial Technical Data Package (TDP) | 1 | 2020 | 1 | 2020 |
| Capability Production Ducment (CPD) Development | 1 | 2020 | 3 | 2020 |
| Cyber Table Top (CTT) Exercise | 2 | 2020 | 2 | 2020 |
| Acquisition Strategy | 2 | 2020 | 2 | 2020 |
| Interim Authorization to Test (IATT) | 3 | 2020 | 3 | 2020 |
| Test Readiness Review (TRR) 1 | 3 | 2020 | 3 | 2020 |
| Incremental Capability and Field Technical Release (FTR) | 3 | 2020 | 3 | 2020 |
| First Article Test | 4 | 2020 | 4 | 2020 |
| Program Life Cycle Cost Estimate (PLCCE) Update 3 | 1 | 2021 | 1 | 2021 |
| Production Readiness Review (PRR) | 1 | 2021 | 1 | 2021 |
| Test and Evaluation Master Plan (TEMP) | 1 | 2021 | 1 | 2021 |
| Engineering Development Models (EDMs) Delivery | 1 | 2021 | 1 | 2021 |
| Final Navy Training Systems Plan (NTSP) | 2 | 2021 | 2 | 2021 |
| Initial Software Release | 3 | 2021 | 3 | 2021 |
| Cost Analysis Requirements Document (CARD) Update 3 | 3 | 2021 | 3 | 2021 |
| GFS Maintenance/Updates | 3 | 2021 | 4 | 2024 |
| TRR 2 | 1 | 2022 | 1 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>3341 / *Network Tactical Common Data Link* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Development Testing (DT) | 1 | 2022 | 1 | 2022 |
| Operational Test Readiness Review (OTRR) | 2 | 2022 | 2 | 2022 |
| GFS Fleet Capability Release | 2 | 2022 | 2 | 2022 |
| Operational Assessment (OA) | 3 | 2022 | 3 | 2022 |
| Final Technical Data Package (TDP) | 4 | 2022 | 4 | 2022 |
| JITC Interoperability Testing | 4 | 2022 | 4 | 2022 |
| Milestone C | 4 | 2022 | 4 | 2022 |
| Low Rate Initial Production (LRIP) Order 1 | 4 | 2022 | 4 | 2022 |
| First LRIP Delivery | 4 | 2023 | 4 | 2023 |
| LRIP Order 2 | 4 | 2023 | 4 | 2023 |
| Authority to Operate | 1 | 2024 | 1 | 2024 |
| TRR 3 | 2 | 2024 | 2 | 2024 |
| Procurement Planning and Strategy Meeting (PPSM) | 2 | 2024 | 2 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4011: *Naval Coastal Warfare Surv and C4I Sys* | 0.000 | 0.000 | 0.000 | 3.045 | - | 3.045 | 3.001 | 2.840 | 2.899 | 2.956 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0604230N from PE 0604280N Project 0411 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The Navy Expeditionary project supports the Navy Expeditionary Combat Command (NECC) mission to detect, deter or interdict potential threats to DoN assets using agile, modular
and scalable technology. NECC units have a number of current and future Command, Control, Communications, Computers & Intelligence (C4I) technological requirements for Tactical/Command Operations Center, tactical vehicles, combatant craft, and dismounted personnel. NECC operations require units to maintain effective command and control, develop and
display a common tactical picture, and share intelligence and current operational information with higher headquarters, subordinate units, joint forces and coalition allies. Small, Medium and Large Scale Communication Systems (LSCS) are the C4I hub for the NECC; Navy Enterprise Tactical Command and Control (NETC2) is the converged LSCS baseline. Future C4I research and development include enhanced information transport, network cyber security posture, cloud-based architecture, assured communications in denied environments along with agility and mobility. Funding also supports testing and evaluation of cyber security issue associated with obsolescence of network items and if not addressed will impact the ability of the Program Office to maintain system accreditation under Risk Management Framework (RMF) revoking multiple LSCS assets authority to connectivity on the Department of Defense Information Network (DoDIN). Efforts are in alignment with NECC's strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities and maintain alignment with greater DoD initiatives, such as Joint Information Environment (JIE), Mission Partner Environment (MPE) in order to maintain interoperability and drive down DoN enterprise costs.

The future of large scale communications assets such as Navy Enterprise Tactical Command and Control (NETC2) (V) 1 and 2, Expeditionary Mine Countermeasures (ExMCM), Assured Command and Control (AC2), will be converging to a Common Expeditionary and Shore Baseline (CESB) culminating in a single RMF Authority to Operate (ATO). Next generation air, surface and subsurface surveillance systems, as well as enhanced C4I capabilities, are required to meet operational objectives. Future technologies are being evaluated as enabling capabilities to expand situational awareness, providing additional tactical decision aids to the local area commander. Future C4I research and development efforts will be identified within NECC strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities to increase agility, mobility and network security posture. Additional efforts will be driven by greater DoD initiatives, such as Joint Information Environment (JIE) Inc II, in order to maintain interoperability and drive down
DoN enterprise costs.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

Funding has been realigned into PE 0604230N from PE 0604280N Project 0411 as part of RDTEN PE Consolidation starting in FY20. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** NECC C4ISR Modernization | 0.000 | 0.000 | 3.045 | 0.000 | 3.045 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 plans funded under PE 0604230N, Project 4011 | | | | | |
| ***FY 2020 Base Plans:***<br>Further investigation of Cloud Technologies to include Software Defined Networking (SDN), Micro segmentation and<br>Episodic Enclaves in order to pace the threat and support speed to capability. Utilize a transformational and streamlined application integration process in support of information warfare and rapid program insertion. Through the use of common and automated baselines, implement new technologies in order to enable rapid introduction of new products and technology, prevent obsolescence, and end of support issues. Investigate the use of Development Operations (DevOps) in order to insert new technology enhancements via incremental software & hardware upgrades and deliver rapid build releases. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY19 funding under PE 0604230N, Project 4011 was $3.043 million. Funding does not appreciably change from FY19 to FY20. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 3.045 | 0.000 | 3.045 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Funding supports an evolutionary acquisition strategy supporting the dynamically evolving rapid action mission of Navy Expeditionary Forces. Small, Medium and Large Scale Communication Systems (LSCS) funding will align LSCS to the Deployable Joint Command and Control (DJC2) product baseline. The project will continuously analyze operational

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

utilization of the systems and will roll analysis results into periodic system upgrades to address cyber security vulnerabilities, obsolescence, and maximize operational effectiveness. The intent of this strategy is to drive down development, production, and logistics costs, while leveraging technologies developed for other agencies to increase the capabilities of Navy Expeditionary Forces. The baseline configuration for Large Scale Communication Systems (LSCS) is the Navy Enterprise Tactical Command and Control (NETC2), a system scalable to Adaptive Force Package (AFP) levels. Efforts include development of capabilities based on emergent requirements, operational feedback, alignment with Dept. of Defense initiatives such as Joint Information Environment (JIE) / Mission Partner Environment, and identification through strategic Expeditionary and Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities to include reach back for tactical vehicles and craft, blue force tracking, tactical data link capability, and sensor technologies in support of surveillance and reconnaissance missions.

**E. Performance Metrics**

The Navy Expeditionary program continues to identify, evaluate and test a minimum of 3-5 new technologies or configurations per year for potential insertion into the Technical Refresh
Plan, to be demonstrated at Fleet Demonstrations.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | Project (Number/Name)<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - Expeditionary | WR | NSWC : PANAMA CITY, FL | 0.000 | 0.000 | | 0.000 | | 0.832 | Nov 2019 | - | | 0.832 | Continuing | Continuing | Continuing |
| Hardware/Software Development | C/CPAF | GTRI : ATLANTA, GA | 0.000 | 0.000 | | 0.000 | | 1.300 | Nov 2019 | - | | 1.300 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.132 | | - | | 2.132 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0604230 Project 0411

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation - Expeditionary | WR | NSWC : PANAMA CITY, FL | 0.000 | 0.000 | | 0.000 | | 0.654 | Nov 2019 | - | | 0.654 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.654 | | - | | 0.654 | Continuing | Continuing | N/A |

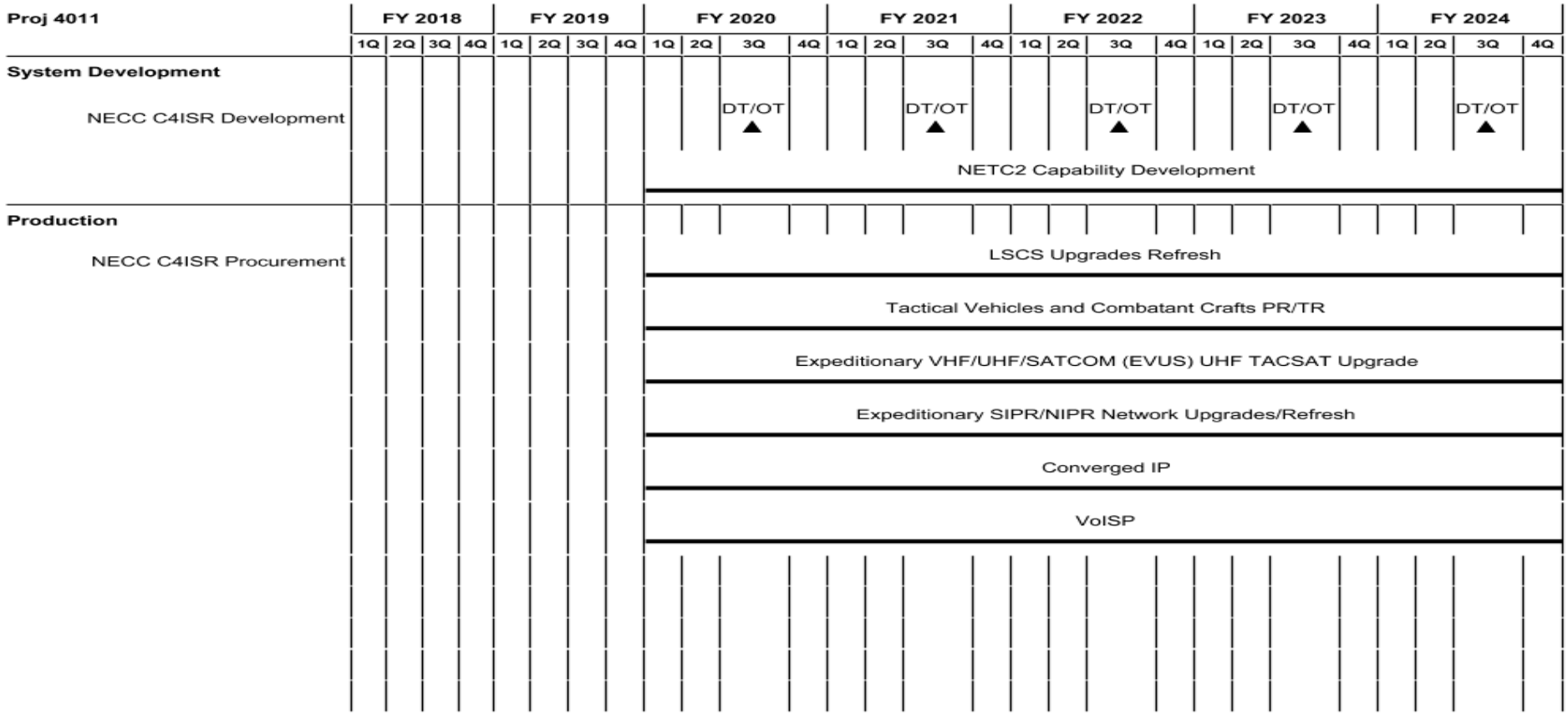
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support - Expeditionary | WR | SSC SD : SSC SAN DIEGO | 0.000 | 0.000 | | 0.000 | | 0.259 | Nov 2019 | - | | 0.259 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.259 | | - | | 0.259 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 3.045 | | - | | 3.045 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |




*2020PB - 0604280N - 4011*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604280N / *JT Tact Radio Sys (JTRS)* | **Project (Number/Name)**<br>4011 / *Naval Coastal Warfare Surv and C4I Sys* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4011*** | | | | |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY20 | 3 | 2020 | 3 | 2020 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY21 | 3 | 2021 | 3 | 2021 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY22 | 3 | 2022 | 3 | 2022 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY23 | 3 | 2023 | 3 | 2023 |
| System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY24 | 3 | 2024 | 3 | 2024 |
| System Development: NECC C4ISR Development: NETC2 Capability Development | 1 | 2020 | 4 | 2024 |
| Production: NECC C4ISR Procurement: LSCS Upgrades Refresh | 1 | 2020 | 4 | 2024 |
| Production: NECC C4ISR Procurement: Tactical Vehicles and Combatant Crafts PR/TR | 1 | 2020 | 4 | 2024 |
| Production: NECC C4ISR Procurement: Expeditionary VHF/UHF/SATCOM (EVUS) UHF TACSAT Upgrade | 1 | 2020 | 4 | 2024 |
| Production: NECC C4ISR Procurement: Expeditionary SIPR/NIPR Network Upgrades/Refresh | 1 | 2020 | 4 | 2024 |
| Production: NECC C4ISR Procurement: Converged IP | 1 | 2020 | 4 | 2024 |
| Production: NECC C4ISR Procurement: VoISP | 1 | 2020 | 4 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604282N *I (U)Next Generation Jammer (NGJ) Increment II* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 29.645 | 55.194 | 93.482 | 111.068 | - | 111.068 | 214.554 | 240.567 | 236.691 | 241.472 | 2,276.475 | 3,499.148 |
| 3380: *Next Generation Jammer Inc II* | 29.645 | 55.194 | 93.482 | 111.068 | - | 111.068 | 214.554 | 240.567 | 236.691 | 241.472 | 2,276.475 | 3,499.148 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** P520 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The Next Generation Jammer (NGJ) is the next step in the evolution of Airborne Electronic Attack (AEA) and is a critical capability necessary to address current, emerging, and evolving Electronic Warfare gaps, ensure kill chain wholeness against growing threat capabilities and capacity, keep pace with enemy threat weapon systems' advancements, and support the continuous expansion of the AEA mission areas that exceed the capability of currently fielded systems. NGJ will utilize enhanced techniques and tactics to deliver significantly improved radar and communications jamming effectiveness as well as other classified capabilities. Utilizing an Open Systems Architecture that supports software and hardware updates to rapidly counter emergent and evolving threats, NGJ is a key enabler and force multiplier for operations across the spectrum of missions defined in the Defense Strategic Guidance, including strike warfare, projecting power despite highly contested environments, and counterinsurgency/irregular warfare. NGJ will also address the shortfalls in scalability, flexibility, supportability, interoperability, availability, and capability of the existing AN/ALQ-99 Tactical Jamming System.

This Program Element (PE 0604282N) supports the Next Generation Jammer - Low Band (NGJ-LB) (formerly known as Next Generation Jammer Increment 2) program. NGJ-LB will address AEA capability and sufficiency gaps against enemy threats operating in the lower frequency bands of the electromagnetic spectrum. NGJ-LB will provide the ability to effectively engage enemy threats from increased stand-off distances, employ increased capacity (number of jamming assignments) against enemy targets, and support agile employment by operators. The NGJ-LB system will be integrated on the EA-18G tactical aircraft and will augment and then replace the legacy AN/ALQ-99 Tactical Jamming System Low-Band pods.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604282N *I (U)Next Generation Jammer (NGJ) Increment II* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 66.686 | 115.253 | 169.567 | - | 169.567 |
| Current President's Budget | 55.194 | 93.482 | 111.068 | - | 111.068 |
| Total Adjustments | -11.492 | -21.771 | -58.499 | - | -58.499 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -21.771 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.133 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -17.492 | - | -17.492 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -41.007 | - | -41.007 |
| • Congressional Directed Reductions Adjustments | -10.359 | - | - | - | - |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $16.831 million to account for the availability of prior year execution balances.

Technical: Not applicable.

Schedule: Pending the program decision point path forward (4th Qtr. 2019) and authority to release either the RFP for EMD or the Rapid Prototype effort (pursuant to 10 U.S.C. 2302 Section 804 and associated Navy Guidance for Middle Tier Acquisition Programs) - The following changes have been made: Systems Development start of H Build Integration changed from 4th Qtr. FY 2020 to 1st Qtr. FY 2020. Engineering Milestones System Functional Review - 2 moved from 2nd Qtr. FY 2022 to 4th Qtr. FY 2020. Engineering Milestones Preliminary Design Review moved from 4th Qtr. FY 2022 to 1st Qtr. FY 2021. Engineering Milestones System Readiness Review - 2 moved from 3rd Qtr. FY 2021 to 4th Qtr. FY 2020. Engineering Milestones System Readiness Review - 1/ System Functional Review - 1 moved from 1st Qtr. FY 2019 to 3rd Qtr. FY 2019.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | Project (Number/Name)<br>3380 / *Next Generation Jammer Inc II* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3380: *Next Generation Jammer Inc II* | 29.645 | 55.194 | 93.482 | 111.068 | - | 111.068 | 214.554 | 240.567 | 236.691 | 241.472 | 2,276.475 | 3,499.148 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P520

**A. Mission Description and Budget Item Justification**

This Program Element (PE 0604282N) supports the Next Generation Jammer - Low Band (NGJ-LB) program. NGJ-LB will address Airborne Electronic Attack (AEA) capability and sufficiency gaps against enemy threats operating in the lower frequency bands of the electromagnetic spectrum. NGJ-LB will provide the ability to effectively engage enemy threats from increased stand-off distances, employ increased capacity (number of jamming assignments) against enemy targets, and support agile employment by operators. The NGJ-LB system will be integrated on the EA-18G tactical aircraft and will augment and then replace the aging AN/ALQ-99 Tactical Jamming System Low-Band pods.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Next Generation Jammer Low Band Primary Hardware Development | 33.733 | 56.980 | 43.176 | 0.000 | 43.176 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue execution of the NGJ-LB Demonstration of Existing Technologies (DET) contracts to inform the acquisition strategy, and development of specification and other products to support the 4th Qtr FY 2019 program decision point and authority to release RFP for an Engineering and Manufacturing Development (EMD) program or a Rapid Prototype effort pursuant to 10 U.S.C. 2302 Section 804 and associated Navy guidance for Middle Tier Acquisition programs. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete execution of the two DET contracts, while exploring additional DET related efforts, and award EMD/ Rapid Prototype contract for follow-on NJG-LB technology development efforts based on technical assessment of data analyzed during the DET phase. Further development of specification and other products to support design, integration, test, and assessment efforts. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | **Project (Number/Name)**<br>3380 / *Next Generation Jammer Inc II* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Funding decreases from FY 2019 to FY 2020 due to multiple DET Contracts concluding and EMD or Rapid prototype planned award in 3Q FY 2020. | | | | | |
| ***Title:*** Next Generation Jammer Low Band Systems Engineering | 19.224 | 33.534 | 46.119 | 0.000 | 46.119 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Start source selection planning for NGJ-LB development contract award in 3rd Qtr FY 2020. Conduct Technical Maturation Assessment utilizing data received from the DET contractors. Execute NGJ-LB System Readiness Review/System Functional Review (SRR-1/SFR-1) for Rapid Prototype solutions and associated program acquisition planning products. | | | | | |
| ***FY 2020 Base Plans:***<br>Conduct source selection for an Engineering and Manufacturing Development (EMD) contract or a Rapid Prototype contract pursuant to 10 U.S.C. 2302 Section 804 and associated Navy guidance for Middle Tier Acquisition programs. Refinement of system specifications to support system requirements (SRR-2/SFR-2) and preliminary design reviews (PDR). Investigate, design, develop, and evaluate related advanced hardware and software technologies. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY 2019 to FY 2020 due to systems engineering requirement in support of development contract award and the systems engineering associated with related advanced hardware and software technologies. | | | | | |
| ***Title:*** Next Generation Jammer Low Band Support & Management Services | 2.237 | 2.856 | 2.913 | 0.000 | 2.913 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Provide Support and Management Services associated with the NGJ-LB Program. | | | | | |
| ***FY 2020 Base Plans:***<br>Provide Support and Management Services associated with the NGJ-LB Program. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | **Project (Number/Name)**<br>3380 / *Next Generation Jammer Inc II* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase from FY 2019 to FY 2020 due to escalation of efforts. | | | | | |
| ***Title:*** Next Generation Jammer Low Band Aircraft Integration | 0.000 | 0.000 | 16.532 | 0.000 | 16.532 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>Utilize data and analysis products for support of Computational Fluid Dynamics (CFD) analysis, wind tunnel test and integration software (H Build) development for interface into the EA-18G. Refinement of the Statement of Requirements (SOR) for aircraft System Configuration Set (SCS) software build including the aircraft integration statement of work and contract award. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY 2019 to FY 2020 due to Aircraft Integration as program activity is initiated. | | | | | |
| ***Title:*** Next Generation Jammer Low Band Test & Evaluation | 0.000 | 0.112 | 2.328 | 0.000 | 2.328 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Begin execution of tests for each DET contractor at the Facility for Antenna Radar Cross Section Measurements (FARM)<br>and execution of resource and infrastructure improvements plan to support DET and follow-on test activities. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete DET Assessment. Development of an Assessment Plan or Test & Evaluation Master Plan (TEMP) to support the technical reviews and define the aeromechanical mission system and the integration flight test program. Continue resource and infrastructure improvements to support DET and follow-on test activities. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | **Project (Number/Name)**<br>3380 / *Next Generation Jammer Inc II* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase from FY 2019 to FY 2020 is due to increased activity for test and evaluation. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 55.194 | 93.482 | 111.068 | 0.000 | 111.068 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

NGJ-LB program is designated a pre-Major Defense Acquisition Program (pre-MDAP), MDAP program number P520. The activity will focus on technology demonstrations and supporting analysis to inform the acquisition strategy, design engineering trades, and the identification of requirements and available technologies for the development program. Execution of the DET activities will validate existing technology maturity for low band applications on the EA-18G and inform the decision to pursue an EMD program or a Rapid Prototype effort pursuant to 10 U.S.C. 2302 Section 804 and associated Navy guidance for Middle Tier Acquisition programs.

**E. Performance Metrics**

Utilize studies and technology demonstration efforts for FY 2020 award of EMD or Rapid Prototype Contact.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | Project (Number/Name)<br>3380 / *Next Generation Jammer Inc II* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary H/W Dev - Aircraft Specification Refinement | SS/CPIF | Boeing : St. Louis, MO | 0.838 | 0.424 | Aug 2018 | 5.404 | Feb 2019 | 5.500 | Feb 2020 | - | | 5.500 | 0.000 | 12.166 | 12.166 |
| Primary H/W Dev - Technology Demonstrators 1 | C/CPFF | L3 : Salt Lake City, UT | 0.000 | 14.704 | Oct 2018 | 12.000 | Nov 2018 | 9.054 | Nov 2019 | - | | 9.054 | 0.000 | 35.758 | 35.758 |
| Primary H/W Dev - Technology Demonstrators 2 | C/CPFF | NGC : Bethpage, NY | 0.000 | 14.704 | Oct 2018 | 12.000 | Nov 2018 | 8.477 | Nov 2019 | - | | 8.477 | 0.000 | 35.181 | 35.181 |
| Primary H/W Dev - Additional Technology Demonstrator effort | TBD | TBD : TBD | 0.000 | 0.000 | | 27.577 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 27.577 | - |
| TBD | TBD | TBD : TBD | 0.000 | 3.901 | Sep 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.901 | - |
| Primary H/W Dev - EMD or Rapid Prototype | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 20.146 | May 2020 | - | | 20.146 | 1,768.455 | 1,788.601 | 1,788.601 |
| Aircraft Integration - Study | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 2.356 | Dec 2019 | - | | 2.356 | 53.831 | 56.187 | - |
| Aircraft Integration | SS/CPIF | Boeing : St. Louis, MO | 0.000 | 0.000 | | 0.000 | | 7.190 | Aug 2020 | - | | 7.190 | 180.103 | 187.293 | 187.293 |
| Software Integration | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 4.063 | 4.063 | - |
| Software Integration | SS/CPIF | Boeing : St. Louis, MO | 0.000 | 0.000 | | 0.000 | | 5.186 | Oct 2019 | - | | 5.186 | 115.205 | 120.391 | 120.391 |
| Software Integration | SS/CPIF | NGC : Bethpage, NY | 0.000 | 0.000 | | 0.000 | | 1.800 | Aug 2020 | - | | 1.800 | 67.592 | 69.392 | 69.392 |
| Software Integration | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 89.194 | 89.194 | - |
| Systems Engineering | TBD | NSMA : Arlington, VA | 0.000 | 0.000 | | 0.000 | | 6.282 | Dec 2019 | - | | 6.282 | 78.337 | 84.619 | 84.619 |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 8.077 | 10.353 | Dec 2017 | 17.541 | Dec 2018 | 21.329 | Dec 2019 | - | | 21.329 | 191.020 | 248.320 | - |
| Systems Engineering | WR | NAWCWD : Point Mugu, CA | 2.585 | 1.428 | Dec 2017 | 4.527 | Dec 2018 | 5.556 | Dec 2019 | - | | 5.556 | 55.284 | 69.380 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | Project (Number/Name)<br>3380 / *Next Generation Jammer Inc II* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NSWC Crane : Crane, IN | 0.796 | 1.783 | Dec 2017 | 2.077 | Dec 2018 | 2.408 | Dec 2019 | - | | 2.408 | 28.936 | 36.000 | - |
| Systems Engineering | SS/CPFF | JHU : Laurel, MD | 1.900 | 5.060 | Dec 2017 | 7.442 | Dec 2018 | 7.956 | Dec 2019 | - | | 7.956 | 91.769 | 114.127 | 114.127 |
| Systems Engineering | Various | Various : Various | 0.090 | 0.600 | Dec 2017 | 1.946 | Dec 2018 | 2.587 | Dec 2019 | - | | 2.587 | 25.747 | 30.970 | - |
| Systems Engineering - Trainer | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 6.351 | 6.351 | - |
| Prior Year Prod Dev no longer funded in FYDP | Various | Various : Various | 14.331 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.331 | - |
| | | **Subtotal** | 28.617 | 52.957 | | 90.514 | | 105.827 | | - | | 105.827 | 2,755.887 | 3,033.802 | N/A |

**Remarks**

Funding increases from FY 2019 to FY 2020 due to the award of EMD or Rapid Prototype contract and integration efforts. FY 2018 TBD line has been reprogrammed via BTR.
FY 2019 Additional Technology Demonstrator funding is to explore additional DET related opportunities.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eng & Tech Srvc (Non FFRDC) | Various | Various : Various | 0.916 | 2.217 | Dec 2017 | 2.743 | Dec 2018 | 2.798 | Dec 2019 | - | | 2.798 | 27.834 | 36.508 | 36.509 |
| | | **Subtotal** | 0.916 | 2.217 | | 2.743 | | 2.798 | | - | | 2.798 | 27.834 | 36.508 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development T&E - TEST DT | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | Nov 2018 | 1.100 | Nov 2019 | - | | 1.100 | 291.796 | 292.896 | - |
| Development T&E - COTF | SS/FFP | FSC : San Diego, CA | 0.108 | 0.000 | | 0.112 | Nov 2018 | 0.115 | Nov 2019 | - | | 0.115 | 2.399 | 2.734 | 2.734 |
| Development T&E - Wind Tunnel | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 1.113 | Jul 2020 | - | | 1.113 | 8.691 | 9.804 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | **Project (Number/Name)**<br>3380 / *Next Generation Jammer Inc II* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development T&E VX-23/31 - Engineers | TBD | Boeing : St. Louis, MO | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 60.931 | 60.931 | 60.931 |
| Development T&E VX-23/31 - Maintenance | TBD | Boeing : St. Louis, MO | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 37.413 | 37.413 | 37.413 |
| Operational T&E - TEST OT | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 22.974 | 22.974 | - |
| | | **Subtotal** | 0.108 | 0.000 | | 0.112 | | 2.328 | | - | | 2.328 | 424.204 | 426.752 | N/A |

**Remarks**

FY19 and FY20 funding to support contractor Demonstration of Existing Technology (DET) test activity as well as test planning and facility/capability based testing (CBTE) effort.

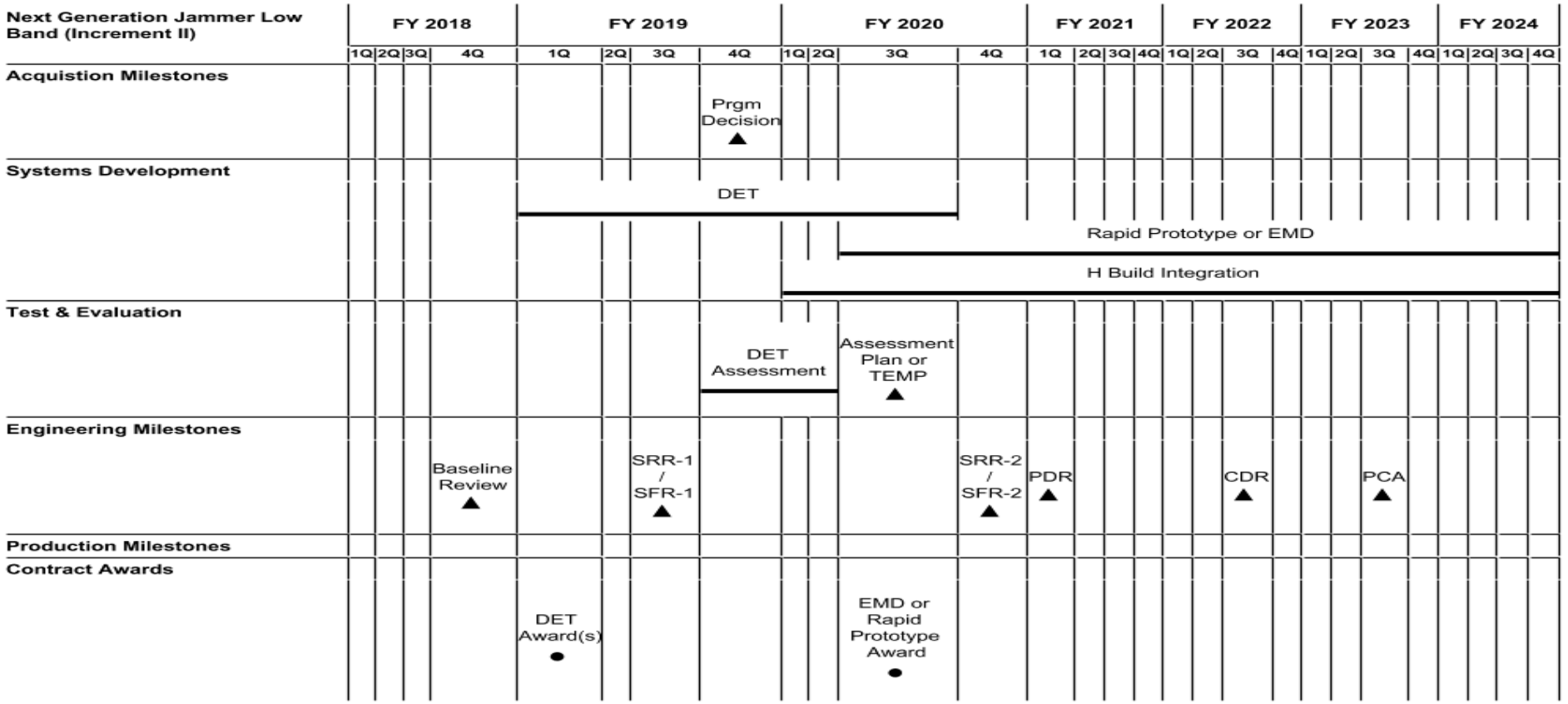
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | Various : Various | 0.004 | 0.020 | Oct 2017 | 0.113 | Oct 2018 | 0.115 | Oct 2019 | - | | 0.115 | 1.834 | 2.086 | - |
| | | **Subtotal** | 0.004 | 0.020 | | 0.113 | | 0.115 | | - | | 0.115 | 1.834 | 2.086 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 29.645 | 55.194 | | 93.482 | | 111.068 | | - | | 111.068 | 3,209.759 | 3,499.148 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | **Project (Number/Name)**<br>3380 / *Next Generation Jammer Inc II* |




*2020PB - 0604282N - 3380*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604282N / *(U)Next Generation Jammer (NGJ) Increment II* | **Project (Number/Name)**<br>3380 / *Next Generation Jammer Inc II* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Next Generation Jammer Low Band (Increment II)*** | | | | |
| Acquistion Milestones: Program Decision | 4 | 2019 | 4 | 2019 |
| Systems Development: Demonstration of Existing Technologies (DET) | 1 | 2019 | 3 | 2020 |
| Systems Development: Rapid Prototype or EMD | 3 | 2020 | 4 | 2024 |
| Systems Development: Aircraft (H Build) Integration | 1 | 2020 | 4 | 2024 |
| Test & Evaluation: DET Assessment | 4 | 2019 | 2 | 2020 |
| Test & Evaluation: Assessment Plan or Test & Evaluation Master Plan | 3 | 2020 | 3 | 2020 |
| Engineering Milestones: Preliminary Design Review | 1 | 2021 | 1 | 2021 |
| Engineering Milestones: Critical Design Review | 3 | 2022 | 3 | 2022 |
| Engineering Milestones: Physical Configuration Audit | 3 | 2023 | 3 | 2023 |
| Engineering Milestones: Program Requirements Baseline Review | 4 | 2018 | 4 | 2018 |
| Engineering Milestones: System Readiness Review - 1 / System Functional Review - 1 | 3 | 2019 | 3 | 2019 |
| Engineering Milestones: System Readiness Review - 2 / System Functional Review - 2 | 4 | 2020 | 4 | 2020 |
| Contract Awards: DET Contract Award(s) | 1 | 2019 | 1 | 2019 |
| Contract Awards: EMD or Rapid Prototype | 3 | 2020 | 3 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604307N *I Surface Combatant Cmbt Sys Eng* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 4,069.441 | 340.760 | 379.116 | 415.625 | - | 415.625 | 361.917 | 325.305 | 289.099 | 288.124 | Continuing | Continuing |
| 1447: *Surf Combatant Combat System Imp* | 4,031.962 | 333.043 | 362.170 | 405.547 | - | 405.547 | 353.019 | 317.337 | 282.960 | 282.776 | Continuing | Continuing |
| 3357: *Aegis Training Improvement Program* | 37.479 | 7.717 | 6.946 | 10.078 | - | 10.078 | 8.898 | 7.968 | 6.139 | 5.348 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.000 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 180 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

This project provides Cruiser and Destroyer AEGIS Combat System (ACS) upgrades and integrates new equipment and systems to pace the threat and capture advances in technology. Examples of captured advanced technologies include: open architecture, advanced information assurance and initial cyber defense, fiber optics, distributed computing architecture, and high performance computing, all of which require corresponding AEGIS Weapon System (AWS) and ACS changes.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 390.238 | 397.403 | 343.636 | - | 343.636 |
| Current President's Budget | 340.760 | 379.116 | 415.625 | - | 415.625 |
| Total Adjustments | -49.478 | -18.287 | 71.989 | - | 71.989 |
| • Congressional General Reductions | - | -1.578 | | | |
| • Congressional Directed Reductions | - | -26.709 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 10.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -9.754 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 72.507 | - | 72.507 |
| • Rate/Misc Adjustments | 0.001 | 0.000 | -0.518 | - | -0.518 |
| • Congressional General Reductions Adjustments | -1.016 | - | - | - | - |
| • Congressional Directed Reductions Adjustments | -38.709 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604307N *I Surface Combatant Cmbt Sys Eng* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *AEGIS Force-Level Interoperability Definintion and Analysis* | 0.000 | 10.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 10.000 |
| Congressional Add Totals for all Projects | 0.000 | 10.000 |

**Change Summary Explanation**

FY18 1447/3357:
Reductions:
-$38.709M: Congressional reductions in AEGIS baseline 5 capability package 2020, AEGIS baseline 10 capability package 2023, Identification Friend or Foe (IFF), and Far Term Interoperability Improvement Plan (FTIIP).

FY19 1447:
Reductions:
-$26.709M: Congressional reductions in AEGIS FTIIP and Combat Systems Test Bed (CSTB).
-$1.578M: Federally funded research and development centers (FRDC).

FY20 1447/3357:
Increases:
+$44.200M: AEGIS Warfighting improvements delivered as part of a AEGIS baseline 9 capability package 2022 update for both CGs and DDGs.
+$24.500M: AEGIS baseline 5 capability package 2023 development and integration efforts.
+$13.000M: AEGIS baseline 9 capability packages 2020 and 2021 Demonstration Testing / Operational Testing requirements to validate warfighting improvements at sea.
+$2.400M: AEGIS training improvements needed to meet Fleet requirements.
Reductions:
-$10.3700M: AEGIS FTIIP elimination
-$2.038M: Contract Service Reform reduction

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | | | | Project (Number/Name)<br>1447 / *Surf Combatant Combat System Imp* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1447: *Surf Combatant Combat System Imp* | 4,031.962 | 333.043 | 362.170 | 405.547 | - | 405.547 | 353.019 | 317.337 | 282.960 | 282.776 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 180

**A. Mission Description and Budget Item Justification**

AEGIS Baseline nomenclature has changed for President's Budget 2020 as follows, ACB-12 with TI-12 is now AEGIS BL 9 Capability package (AEGIS BL 9 (2015) 2015, ACB-16 with TI-12 is now AEGIS BL 9 Capability Package (AEGIS BL 9 2018) 2018, ACB-16 with TI-12H is now AEGIS BL 9 Capability Package (AEGIS BL 9 2020) 2020, ACB-16 with TI-16 is now AEGIS BL 9 Capability Package (AEGIS BL 9 2021) 2021, and ACB-20 with TI-16 is AEGIS BL 10 Capability Package (AEGIS BL 9 2023) 2023. AEGIS Baseline 9 capability package 2015 (AEGIS BL 9 2015) includes new technology and capabilities to replace aging MIL-SPEC equipment, extend service life, and maintain the combat viability of AEGIS ships into the future. AEGIS BL 9 2015 has been installed during modernization availabilities to DDG 51-53, 57, 61, 65 and 69 and CG 59, 60, 62 and also introduced on new construction destroyers (DDG 113-118).

AEGIS Baseline 9 capability packages 2018, 2020, and 2021 (AEGIS BL 9 2018, 2020, 2021) will deliver additional warfighter improvements to the AEGIS Fleet to include improved Ballistic Missile Defense (BMD) capabilities (DDG only), SEWIP BLK II, MH-60R Integration, SPQ-9B in the Fire Control Loop, Total Ship Training Capability (TSTC), Condition Based Maintenance, Combat System Boundary Defense, NIFC-CA 2019, and NIFC-CA Collateral #3. AEGIS BL 9 2018 will be delivered (including back-fit) to 15 DDGs (51/52/57/61/65/69/80/113-120), 7 CGs (52-58) and 2 AEGIS ASHORE (AA) sites (Poland/Romania); AEGIS BL 2020 will initially be delivered to 2 DDGs (79/83) and 7 CGs (63-65/66/68/69/71); and AEGIS BL 9 2021 will be delivered to 12 DDGs (81/84-88/92/94/121-124, 127).

AEGIS Baseline 10 capability package 2023 (AEGIS BL 10 2023) will provide critical warfighter improvements to the AEGIS FLT III Destroyers. AEGIS BL 10 2023 combat system development efforts include integration of the Air and Missile Defense Radar (AMDR) SPY-6 while building upon AEGIS BL 9 to form the foundation for the AEGIS Flight III DDG Combat System.

AEGIS Far Term Interoperability Improvement Plan (FTIIP) addressed interoperability issues within fielded AEGIS Combat System configurations.

AEGIS Task Force Cyber Awakening effort assesses and delivers design improvements to AEGIS Combat System Computer Program and Hardware configurations to counter emerging cyber threats. These improvements are implemented within AEGIS Combat Systems configurations currently under development and include updates to Boundary Defense Components (BDC).
AEGIS BL 5 capability package 2020 (AEGIS BL 5 2020) combines AEGIS BL 5 and BMD 4.1 into single AEGIS Computer Program enabling near simultaneous shift between AAW and BMD operations for the AEGIS Flight I/II DDGs as well as a combined Air and Ballistic Missile Defense capability. Additional capabilities delivered with AEGIS BL 5 2020 include SM-6 integration, as well as capabilities developed to address Fleet Urgent Operational Needs (UONs).

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

AEGIS BL 5 capability package 2023 (AEGIS BL 5 2023) includes refurbishment of the SPY-1D radar arrays with installation of Low Noise Amplifiers (LNA) to improve radar sensitivity against emerging threats through the end of the Flight I/II DDG service life.

AEGIS IFF MODE 4/5 Integration program addresses IFF Mode 4 issues and fully integrates Mode 5 IFF for all AEGIS Baselines by 2020 in support of Fleet direction.

Combat Systems Test Bed (CSTB) will address the current limitations in AEGIS Modeling & Simulation highlighted by DOT&E in previous AEGIS baselines. Combat Systems Test Bed will provide automated analysis to efficiently process large amounts of M&S data. The CSTB has already been used to aid in the modeling and simulation of combat systems performance prior to the execution of every AEGIS Baseline 9 live fire testing since JAN 2015 and has a proven track record of realistic predictions and the identification of mission critical software defects. CSTB is already being utilized to predict AEGIS Baseline 9 2018 system performance on Cruisers and Destroyers, and has already run over 145,000 missile scenarios, with an associated cost avoidance of $584M. The CSTB helps save on the use of targets and weapons required during live fire tests of new Combat Systems capabilities. DOT&E requires use of CSTB as noted in DOT&E letter dated Aug 09, 2013 and Jun 09, 2014. CSTB will continue to be used by IWS1 with expanded capabilities in 2018, 2019, and 2020, and by Commander Operational Test and Evaluation Force for AEGIS BL 9 Critical Operational Issue evaluations in 2022. The CSTB will be a critical system for Frigate Combat System and AEGIS BL 10 2023.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AEGIS DEVELOPMENT SUPPORT | 27.640 | 36.833 | 38.774 | 0.000 | 38.774 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** AEGIS Development Support includes the following: AEGIS Technical Design Agent (TDA), AEGIS System Engineering, COTS Obsolescence evaluation, Future Surface Combatant (FSC) planning, AEGIS Development Site Operations and Maintenance, and Small Business Innovation Research (SBIR). | | | | | |
| ***FY 2019 Plans:***<br>AEGIS TDA evaluation of Combat System configurations to assess overall performance and identify areas where modifications can be implemented to improve the performance of the AEGIS Combat System for all warfare areas.<br><br>AEGIS System engineering evaluation of AEGIS Combat System performance and development of the AEGIS Capability Phasing Plan to ensure that warfighter improvements are implemented through future Combat System upgrades to meet emerging threats. These efforts are focused on defining future capability upgrades to the AEGIS Combat System.<br><br>AEGIS COTS Obsolescence to include evaluation of systems currently delivered as well and those under development. These updates are focused on replacing high failure rate components in addition to monitoring and resolving obsolescence issues for all AEGIS hardware configurations. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Future Surface Combatant studies and analysis will deliver requirements and concept of employment for the next surface combatant.<br><br>AEGIS Development Site Operation and Maintenance for the Land Based Test Sites (LBTS) ensures that adequate hours are available to support all planned AEGIS baseline development efforts. The LBTS include; Combat System Engineering Development Site (CSEDS), Program Generation Center (PGC), SPY-1A Test Facility (STF), Naval Systems Computing Center (NSCC), and Surface Combat System Center (SCSC).<br>***FY 2020 Base Plans:***<br>AEGIS TDA evaluation of Combat System configurations to assess overall performance and identify areas where modifications can be implemented to improve the performance of the AEGIS Combat System for all warfare areas.<br><br>AEGIS System engineering evaluation of AEGIS Combat System performance and development of the AEGIS Capability Phasing Plan to ensure that warfighter improvements are implemented through future Combat System upgrades to meet emerging threats. These efforts are focused on defining future capability upgrades to the AEGIS Combat System.<br><br>AEGIS COTS Obsolescence to include evaluation of systems currently delivered as well and those under development. These updates are focused on replacing high failure rate components in addition to monitoring and resolving obsolescence issues for all AEGIS hardware configurations.<br><br>Future Surface Combatant studies and analysis will deliver requirements and concept of employment for the next surface combatant.<br><br>AEGIS Development Site Operation and Maintenance for the Land Based Test Sites (LBTS) ensures that adequate hours are available to support all planned AEGIS baseline development efforts. The LBTS include; Combat System Engineering Development Site (CSEDS), Program Generation Center (PGC), SPY-1A Test Facility (STF), Naval Systems Computing Center (NSCC), and Surface Combat System Center (SCSC).<br>***FY 2020 OCO Plans:*** | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase to support Future Surface Combatant Studies and Analysis to support requirements definition. | | | | | |
| ***Title:*** AEGIS CRUISER BL 9 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 12 (BL 9.A2))<br>***Articles:*** | 39.251<br>- | 43.113<br>- | 23.900<br>- | 0.000<br>- | 23.900<br>- |
| ***Description:*** Develops and delivers AEGIS Cruiser baseline 9 upgrades. The Cruiser configuration of AEGIS BL 9 2018 includes the following warfighting improvements; SEWIP Integration - Electronic Warfare aided kill evaluation, SPQ-9B AW engage, UAV improvements with Agile Sundowner, stream raid improvements with Agile Storm, and Gun Weapon System splash avoidance. The Cruiser configuration of AEGIS BL 9 2020 captures additional warfighting improvements to include ESSM Blk 2 Functional, SEWIP - Early Hard Kill/Soft Kill Coordination / Advanced Off-board Electronic Warfare communication, NIFC-CA Collateral III, NIFC-CA 2019, and National Technical Means integration with Agile Thunder.<br><br>***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery. CG at sea event preparation, at sea test event and post event support efforts required to field AEGIS BL 9 2018 on CG 63 and 64. Underway testing includes installation and checkout of computer program, Combat System Test events 1 and 2, scenario development, and CSSQT Planning required to support FY20 efforts.<br><br>Engineering Assessments. Complete data analysis of Engineering Assessment completed in 2018 and planning, execution and data analysis of Engineering Assessment planned in 2nd QTR 2019.<br><br>Programmatic and technical leadership in a collaborative Navy and industry environment. Program Management Team (PMT), System Engineering Cross Product Team (SECPT), Element, Safety, Configuration Management (CM), Test & Evaluation (T&E), Certification, and Subject Matter Experts (SMEs). Participate in and evaluate remaining AEGIS BL 9 2020 design decisions, Engineering Technical Reviews (ETR), Specification Change, Review, Implementation, and baseline governance boards and Navy Review Team (NRT). Execute Test Execution activities and stimulation capability. Execute Combat System certification activities required to support FY20 Certification. Execute risk management. Develop briefs for technical and programmatic meetings in support of Mission Readiness Assessments (MRAs), In Process Reviews (IPRs), Program Reviews, and Test Readiness Reviews (TRRs). Execute Combat System Safety Program to include Weapon System Explosive Safety Review Board (WSESRB). | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Computer Program emergent correction as required to address software limitations impacting planned underway test events or computer program certification.<br><br>Computer Program updates required to address various hardware configurations.<br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery. AEGIS BL 9 2020 Certification.<br><br>CG at sea event preparation, at sea event conduct and post event support efforts required to field AEGIS BL 9 2018 on CG 65 and 69. Underway testing includes installation and checkout of computer program, Combat System Test events 1 and 2, Discrepancy investigation and resolution, Scenario development, CSSQT planning and post event analysis required to support FY20 CSSQT for CG 63, 64, 65, and 69.<br><br>Combat System Certification in 1st QTR to support fielding of the AEGIS Computer Program.<br><br>Computer program emergent corrections as required to address software defects that impact planned underway test events or computer program certification.<br><br>Computer Program updates required to address various hardware configurations.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to scope reduction, all LBTS testing completed in support of certification and ship installation. | | | | | |
| ***Title:*** AEGIS DESTROYER BL 9 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 16 / TECHNOLOGY INSERTION 16 (BL 9.C2))<br>***Articles:***<br><br>***Description:*** Develops and delivers AEGIS BL 9 Destroyer upgrades. AEGIS BL 9 2018 captures warfighting improvements to include; BMD 5.1, SEWIP Integration - EW aided kill evaluation, SPQ-9B AW Engage, UAV Improvements with Agile Sundowner, Raid Improvements with Agile Storm, and Gun Weapon System splash avoidance. AEGIS BL 9 2020 includes BMD 5.1.1, ESSM Blk 2 Functional, SEWIP - Early Hard Kill/Soft Kill | 68.591<br>- | 31.500<br>- | 74.413<br>- | 0.000<br>- | 74.413<br>- |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Coordination / Advanced Off-board Electronic Warfare communication, NIFC-CA Collateral III, NIFC-CA 2019, and National Technical Means integration with Agile Thunder. AEGIS BL 9 2021 includes BMD 5.1.2, SEWIP - Auto Association, Advanced Training Domain, IAMD Mission Planner, Above Water Sensor Coordinator, Hypersonic tracking improvements with Agile Sirocco, and Electronic Warfare operator enhancements with Agile Moondog.<br><br>***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery.<br>AEGIS BL 9 2020 Engineering Assessment #2 MAR 2019<br>AEGIS BL 9 2020 Certification Planning AUG-SEP 2019<br>AEGIS BL 9 2021 IPR #5 MAR 2019<br>AEGIS BL 9 2021 Engineering Assessment #1 AUG 2019<br><br>AEGIS code development and integration of the following capabilities: BMD 5.1.2, SEWIP - Auto Association, Advanced Training Domain, IAMD Mission Planner, Above Water Sensor Coordinator, Agile Sirocco, and Agile Moondog.<br><br>DDG at sea event preparation, at sea test event execution and post event support efforts required to field AEGIS BL 9 2020 on DDG 79, and 83 and AEGIS BL 9 2021 on DDG 84, and 86. Underway testing includes installation and checkout of computer program, Combat System Test events 1 and 2, discrepancy investigation and resolution, scenario development, CSSQT planning and post event analysis required to support FY19/20 CSSQT on DDG 79, 83, 84, and 86.<br><br>Engineering Assessments. Complete data analysis of Engineering Assessment completed in SEP 2018 and supporting planning, execution, and data analysis of Engineering Assessment planned in 2nd QTR 2019.<br><br>Programmatic and technical leadership in a collaborative Navy and industry environment. Program Management Team (PMT), System Engineering Cross Product Team (SECPT), Element, Safety, Configuration Management (CM), Test & Evaluation (T&E), Certification, and Subject Matter Experts (SMEs). Participate in and evaluate remaining AEGIS BL 9 2020 design decisions, Engineering Technical Reviews (ETR), Specification Change, Review, Implementation, and baseline governance boards and Navy Review Team (NRT). Execute Test Execution activities and stimulation capability. Execute Combat System certification activities required to support FY20 Certification. Execute risk management. Develop briefs for technical and programmatic meetings | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| in support of Mission Readiness Assessments (MRAs), In Process Reviews (IPRs), Program Reviews, and Test Readiness Reviews (TRRs). Execute Combat System Safety Program to include Weapon System Explosive Safety Review Board (WSESRB).<br><br>Computer Program updates required to deliver the TI-12H backfit hardware upgrade. Updates are required to ensure that the ACS configuration will work with the installed TI 12H equipment.<br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery. Phase 2 Certification Planning AUG-SEP 2020<br><br>Execute Combat System Certification 1st QTR for all DDG variants to support fielding of the AEGIS Computer Program.<br><br>Computer Program emergent correction as required to address software limitation impacting planned Underway Test events or Computer Program Certification.<br><br>DDG At-Sea Event Preparation, At-Sea Test Event Execution and Post-Event Support efforts required to field AEGIS BL 9 2020 on DDG 79, and 83 and AEGIS BL 9 2021 on DDG 84, and 86. Underway testing include installation and checkout of Computer Program, Combat System Test events 1 and 2, Discrepancies investigation and resolution, Scenario development, CSSQT Planning and post event analysis required to support FY19/20 CSSQT on DDG 79, 83, 84, and 86. Includes Developmental Testing (DT) for the DDG configuration as part of the At-Sea events.<br><br>Computer Program updates required to address various hardware configurations.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase to support AEGIS BL 2022 Code Development to deliver the following warfighter capabilities; ESSM BLK II optimized, MMSP-R, ALPS, High Energy Laser with Integrated Optical-Dazzler and Surveillance | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| (HELIOS), Standard Missile 6 Block IB, and the Maritime Strike Tomahawk identified as CNO priorities, and integration of the next generation surface search radar (NGSSR). | | | | | |
| ***Title:*** AEGIS FLT III DESTROYER BL 10 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 20 / TECHNOLOGY INSERTION 16/20) | 116.475 | 157.978 | 168.717 | 0.000 | 168.717 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develops and delivers AEGIS BL 10 FLT III Destroyer upgrades. AEGIS BL 10 2023 includes the following warfighting improvements; SPY-6 (AMDR), BMD 6.0, Close in Weapons System (CIWS) point defense sensor integration, Cyber Security improvements, and MK 160 Gun Computing System (GCS) improvements . | | | | | |
| ***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery.<br>In-Progress Review #3 MAR 2019<br><br>AEGIS Code Development and Integration of the following capabilities: SPY-6 (AMDR), BMD 6.0, MK 160 GCS improvements, CIWS sensor data integration, and Cyber security improvements.<br><br>Site Activation required to support AEGIS BL 10 2023 development and integration testing. This supports procurement of equipment required to simulate the SPY-6 radar needed to complete required integration testing in supporting of code development.<br><br>SPY-6 radar integration within the AEGIS Combat System. Provides funding to complete SPY-6 development and resolve integration discrepancies discovered during the testing process.<br><br>Evaluate and map all Flight III DDG requirements to support future integration and delivery to the first Flight III DDG.<br><br>Programmatic and technical leadership in a collaborative Navy and industry environment. Program Management Team (PMT), System Engineering Cross Product Team (SECPT), Element, Safety, Configuration Management (CM), Test & Evaluation (T&E), Certification, and Subject Matter Experts (SMEs). Participate in and evaluate AEGIS BL 10 2023 design decisions, Engineering Technical Reviews (ETR), Specification Change, Review, Implementation, and baseline governance boards and Navy Review Team (NRT). Execute Test Execution activities and stimulation capability. Execute risk management. Develop briefs for technical and programmatic | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| meetings in support of Mission Readiness Assessments (MRAs), In Process Reviews (IPRs), Program Reviews, and Test Readiness Reviews (TRRs). Execute Combat System Safety Program to include Weapon System Explosive Safety Review Board (WSESRB). Early Test and Evaluation efforts being conducted at Land Based Test Sites to validate Computer Program development and integration efforts as required to meet the delivery to the first Flight III DDG.<br><br>Integrating Modeling and Simulation products to improve requirements test coverage and reduce future test requirements.<br><br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery.<br><br>In-Progress Review #4 NOV 2019<br>In-Progress Review #5 JUL 2020<br><br>Continued AEGIS Code Development and Integration of the following capabilities: SPY-6 (AMDR), BMD 6.0, MK 160 GCS improvements, CIWS sensor data integration, and Cyber security improvements.<br><br>Site Activation required to support AEGIS BL 10 2023 Development and Integration Testing. This supporting the procurement of equipment required to simulate the SPY-6 radar to complete required integration testing in supporting of code development.<br><br>SPY-6 Radar Integration within the AEGIS Combat System. Provides funding to complete SPY-6 development and resolve integration discrepancies discovered during the testing process.<br><br>Evaluate and map all Flight III DDG requirements to support future integration and delivery to the first Flight III DDG.<br><br>Programmatic and technical leadership in a collaborative Navy and industry environment. Program Management Team (PMT), System Engineering Cross Product Team (SECPT), Element, Safety, Configuration Management (CM), Test & Evaluation (T&E), Certification, and Subject Matter Experts (SMEs). Participate in and evaluate AEGIS BL 10 2023 design decisions, Engineering Technical Reviews (ETR), Specification Change, Review, Implementation, and baseline governance boards and Navy Review Team (NRT). Execute Test Execution | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| activities and stimulation capability. Execute risk management. Develop briefs for technical and programmatic meetings in support of Mission Readiness Assessments (MRAs), In Process Reviews (IPRs), Program Reviews, and Test Readiness Reviews (TRRs). Execute Combat System Safety Program to include Weapon System Explosive Safety Review Board (WSESRB). Early Test and Evaluation efforts being conducted at Land Based Test Sites to validate Computer Program development and integration efforts as required to meet the delivery to the first Flight III DDG.<br><br>Early Test and Evaluation efforts being conducted at Land Based Test Sites to validate Computer Program development and integration efforts as required to meet the delivery to the first Flight III DDG.<br><br>Integrating Modeling and Simulation products to improve requirements test coverage and reduce future test requirements.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase due to SPY-6 Integration costs and the increased number of test requirements based on amount of coding completed in FY19. | | | | | |
| ***Title:*** AEGIS DESTROYER BL 5 UPGRADES (PREVIOUSLY AEGIS BL 5.4 UPGRADE)<br>***Articles:***<br><br>***Description:*** AEGIS BL 5 2020 combines AEGIS BL 5 and BMD 4.1 into single AEGIS Computer Program enabling near simultaneous shift between AAW and BMD operations for the AEGIS Flight I/II DDGs as well as a combined Air and Ballistic Missile Defense capability. Additional capabilities delivered with AEGIS BL 5 2020 include SM-6 integration, as well as capabilities developed to address Fleet Urgent Operational Needs (UONs). AEGIS BL 5 2023 includes refurbishment of the SPY-1D radar arrays with installation of Low Noise Amplifiers (LNA) to improve radar sensitivity against emerging threats through the end of the Flight I/II DDG service life.<br><br>***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery.<br>In Progress Review #3 NOV 2018 (AEGIS BL 5 2020)<br>In Progress Review #4 MAY 2019 (AEGIS BL 5 2020)<br>Engineering Assessment (EA) SEP 2019 (AEGIS BL 2020) | 41.967<br>- | 41.400<br>- | 46.905<br>- | 0.000<br>- | 46.905<br>- |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| AEGIS BL 5 2020 code development, integration and testing required the merge AEGIS BL 5 and BMD 4.1 functionality in a single computer program.<br><br>Programmatic and technical leadership in a collaborative Navy and industry environment. Program Management Team (PMT), System Engineering Cross Product Team (SECPT), Element, Safety, Configuration Management (CM), Test & Evaluation (T&E), Certification, and Subject Matter Experts (SMEs). Participate in and evaluate remaining AEGIS BL 5 2020 design decisions, Engineering Technical Reviews (ETR), Specification Change, Review, Implementation, and baseline governance boards and Navy Review Team (NRT). Execute Test Execution activities and stimulation capability. Execute Combat System certification activities required to support FY20 Certification. Execute risk management. Develop briefs for technical and programmatic meetings in support of Mission Readiness Assessments (MRAs), In Process Reviews (IPRs), Program Reviews, and Test Readiness Reviews (TRRs). Execute Combat System Safety Program to include Weapon System Explosive Safety Review Board (WSESRB).<br><br>Early LNA Firmware Development to support AEGIS BL 5 2023 and Wallops Island Virginia site modifications in preparation for the installation of the LNA array to support future test and evaluation efforts.<br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery.<br>System Requirements Review OCT 2019 (AEGIS BL 5 2023)<br>Combat System Certification Panel MAY 2020 (AEGIS BL 5 2020)<br>In Progress Review #1 JUN 2020 (AEGIS BL 5 2023)<br><br>Programmatic and technical leadership in a collaborative Navy and industry environment. Program Management Team (PMT), System Engineering Cross Product Team (SECPT), Element, Safety, Configuration Management (CM), Test & Evaluation (T&E), Certification, and Subject Matter Experts (SMEs). Participate in and evaluate remaining AEGIS BL 5 2023 design decisions, Engineering Technical Reviews (ETR), Specification Change, Review, Implementation, and baseline governance boards and Navy Review Team (NRT). Execute Test Execution activities and stimulation capability. Execute Combat System certification activities required to support FY20 Certification. Execute risk management. Develop briefs for technical and programmatic meetings in support of Mission Readiness Assessments (MRAs), In Process Reviews (IPRs), Program Reviews, and Test | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Readiness Reviews (TRRs). Execute Combat System Safety Program to include Weapon System Explosive Safety Review Board (WSESRB).<br><br>Continued LNA Firmware Development to support AEGIS BL 5 2023 and Wallops Island Virginia site modifications in preparation for the installation of the LNA array to support future test and evaluation efforts..<br><br>AEGIS BL 5 2023 code development, integration, and testing.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increased funding required to certify AEGIS BL 5 2020 and commence development of AEGIS BL 5 2023. | | | | | |
| ***Title:*** AEGIS: FIX IFF MODE 4 / ACCELERATE MODE 5 | 18.752 | 28.691 | 21.470 | 0.000 | 21.470 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This program addresses an immediate operational issue to fix Identification Friend or Foe (IFF) mode 4 as well as accelerate integration of IFF mode 5 and bring all AEGIS Cruisers and Destroyers into IFF mode 5 compliance by 2020 in accordance with the JROC mandate to sunset IFF mode 4<br><br>***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery.<br><br>Final code development of full IFF Mode 5 integration, and testing within the AEGIS CSL supporting both the Cruiser and Destroyer configuration of AEGIS BL 9 2018.<br><br>Acceleration of an in service update for both AEGIS BL 5 and AEGIS BL 7.<br>AEGIS BL 5 2019 CSCPs third and fourth quarter FY19<br>AEGIS BL 7 2019 CSCP third quarter FY19<br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery.<br><br>AEGIS BL 5 2020 CSCP OCT 2020 | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| AEGIS BL 9 2020 CSCP OCT 2020<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Reduction due to the completion of AEGIS BL 9 2018 IFF updates. | | | | | |
| ***Title:*** COMBAT SYSTEMS TEST BED (CSTB)<br>***Articles:*** | 0.000<br>- | 7.855<br>- | 18.688<br>- | 0.000<br>- | 18.688<br>- |
| ***Description:*** Combat Systems Test Bed (CSTB) will address the current limitations in AEGIS Modeling & Simulation highlighted by DOT&E in previous AEGIS baselines. Combat Systems Test Bed will provide automated analysis to efficiently process large amounts of M&S data The CSTB has already been used to aid in the modeling and simulation of combat systems performance prior to the execution of every AEGIS Baseline 9 live fire testing since JAN 2015 and has a proven track record of realistic predictions and the identification of mission critical software defects. CSTB is already being utilized to predict AEGIS Baseline 9 2018 system performance on Cruisers and Destroyers, over 145,000 missile scenarios have already been executed, with an associated cost avoidance of $584M. The CSTB helps save on the cost of targets and weapons required during live fire tests of new Combat Systems capabilities. DOT&E requires use of CSTB as noted in DOT&E letter dated Aug 09, 2013 and Jun 09, 2014. CSTB will continue to be used by IWS1 and by Commander Operational Test and Evaluation Force for AEGIS BL 9 Critical Operational Issue evaluations in 2022. The CSTB will be a critical system for Frigate Combat System and AEGIS BL 10 2023. CSTB Build 1 has been completed as a prototype with 6 more build planned to provide more functionality to improve predictive analysis and reduce at-sea test requirements.<br><br>***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery.<br><br>In-Progress Review #1 JAN 2019<br>Build 2 delivery FEB 2019<br>Verification, Validation & Accreditation data review build 2 JUN 2019<br>In-Progress Review #2 JUL 2019 | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Government oversight of Combat System Test Bed development and support for the Verification, Validation, & Accreditation process.<br><br>Development and integration of CSTB Build 2 required to support the following efforts:: (1) At-Sea -Test event planning for AEGIS BL 9 2018 utilizing AN/SPY-1, Weapons Control System (WCS), Command & Decision (C&D) and ESSM Block 1. (2) Assessment of new AEGIS Speed to Capability (ASToC) capabilities. (3) Analysis of performance deltas between Common Source Library (CSL) builds.<br><br>Development and integration of CSTB Build 3 was cancelled due to FY19 Congressional mark. Build 3 would have expanded the capabilities delivered in CSTB Build 2, required to support the following efforts: initial AEGIS BL 10 2023 capabilities and the integration of AN/SPY-6, ESSM Block 2, and SLQ-32v(6) models. Build 3 was targeted to support the AEGIS BL 9 2018, 2020, and 2021 Operational Test (OT) Runs for Record.<br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery.<br><br>In-Progress Review #4 NOV 2019<br>Commence Development of Build 4<br>In-Progress Review #2 JUL 2020<br><br>Government oversight of Combat System Test Bed development and support for the Verification, Validation, & Accreditation process.<br><br>Development and integration of CSTB Build 3 expands on the capabilities delivered in CSTB Build 2, required to support the following efforts: initial AEGIS BL 10 2023 capabilities and the integration of AN/SPY-6, ESSM Block 2, and SLQ-32V(6) models. Build 3 is targeted to support the AEGIS BL 9 2018, 2020, and 2021 Operational Test (OT) Runs for Record, and significant verification and validation (V&V) of the requisite AN/SPY-1, Weapon Control System (WCS), Command & Decision (C&D), ESSM Block 1, and SM-2 Block IIIA/IIIB model capabilities will occur in FY19. AEGIS BL 10 2023 V&V will be on-going, culminating in delivery of Developmental Test (DT) and OT Accreditation Plans. Finally, CEC, CIWS, and SM-6 Block I models will continue integration and testing. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Development and integration of CSTB Build 4 expands on the capabilities delivered in CSTB Build 2, including SM-6 BLK I, SM2-BLK IIIB, ESSM BLK I, CIWS, and VLS.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase due to development of CSTB build number 3 deferred from FY19. Build 3 includes the integration of AN/SPY-6, SSM Block 2, and SLQ-32V(6) | | | | | |
| ***Title:*** TASK FORCE CYBER AWAKENING (TFCA) | 16.367 | 10.500 | 12.680 | 0.000 | 12.680 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provides solutions to address AEGIS Cyber deficiencies and vulnerabilities. Solutions include the AEGIS Cyber security toolkit, file integrity checker, anti-malware, USB media detection, boundary proxy service, system incident and event manager, common user interface, network device integrity, identification management, certificate management, secure boot, application whitelisting, sandbox, cross domain and daily report capabilities. These solutions will be delivered as part of planned AEGIS BL 9 and 10 updates.<br>***FY 2019 Plans:***<br>Specific FY19 milestones will include the following to ensure the below tasking is on track to support delivery.<br>In-Progress Review #6 FEB 2019<br>In-Progress Review #7 AUG 2019<br><br>Integration efforts related to fielding Cyber capabilities within the AEGIS Common Source Library (CSL).<br><br>System engineering efforts to identify, evaluate, and develop potential solutions required to address Cyber deficiencies within the AEGIS Combat System<br>***FY 2020 Base Plans:***<br>Specific FY20 milestones will include the following to ensure the below tasking is on track to support delivery.<br>In-Progress Review #8 FEB 2020<br>In-Progress Review #9 AUG 2020<br><br>Integration efforts related to fielding Cyber capabilities within the AEGIS Common Source Library (CSL). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| System engineering efforts to identify, evaluate, and develop potential solutions required to address Cyber deficiencies within the AEGIS Combat System<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase due to additional efforts planned to identify and resolve Cyber issues within the AEGIS Weapon System. | | | | | |
| ***Title:*** FAR TERM INTEROPERABILITY IMPROVEMENT PLAN (FTIIP)<br>***Articles:***<br>***Description:*** FTIIP included development of Link 16 Digital Air Control (DAC) phase 1 capability to integrate with the next generation fighter (F-35). DAC is the only means available for the F-35 to inject sensor data into the Carrier Strike Group (CSG) common tactical picture in an adverse communications denied environment. DAC phase 1 is a distributed lethality enabler.<br>***FY 2019 Plans:***<br>Analysis of a Link-16 DAC F-35 Tracking Exercise conducted in FY18<br>***FY 2020 Base Plans:***<br>None<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to completion of the at sea demonstration live fire event in FY18. | 4.000<br>- | 4.300<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 333.043 | 362.170 | 405.547 | 0.000 | 405.547 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • R&D 0604501N: *Multi Mission Signal Processor* | 2.424 | 2.503 | 2.567 | - | 2.567 | 2.856 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • SCN 2122: *DDG 51* | 3,498.792 | 5,945.731 | 5,373.323 | - | 5,373.323 | 3,483.842 | 3,600.696 | 6,159.792 | 5,649.274 | 3,803.000 | 118,036.476 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 0900: *DDG Modernization* | 592.644 | 462.908 | 566.140 | - | 566.140 | 555.525 | 812.338 | 1,042.482 | 1,107.075 | 2,558.665 | 10,388.593 |
| • R&D 0604378N PU 3159: *NIFC-CA* | 27.359 | 29.092 | 25.767 | - | 25.767 | 25.694 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN 5231: *Ship Missile Support Equipment (AEGIS Support Equipment)* | 76.236 | 33.692 | 89.000 | - | 89.000 | 98.288 | 99.468 | 101.184 | 88.813 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Combat system improvements are implemented in baselines as described in the project mission statement. After the combat system is completed and tested, the computer program and associated equipment are delivered to the new construction shipbuilders and modernization shipyards where the computer program and equipment are installed and tested along with all other elements of the shipboard combat system and associated combat support systems. The computer program is a Government Furnished Computer Program (GFCP) deliverable to the Production Test Center for equipment test and check out. Future Combat System deliveries will be provided using the Combat System Engineering Agent (CSEA) contract. Additional modifications to the existing contracts will address any war fighting improvements as directed by OPNAV.
Currently PEO IWS 1.0 has existing contracts or pending contract actions support all efforts defined within the Budget Exhibit. A summary of contracts and contractual actions are captured below.

Active Major Contracts:
N00024-13-C-5116: Competitive award to support AEGIS BL 9 2018 and follow on efforts - Period of Performance FY13-FY23
ECP pending for AEGIS BL 9 2022, post demo, and AEGIS BL 10 2023 LOE increase - planned award 2ND QTR FY19
N00024-16-C-5102: Sole source follow on to complete AEGIS BL 9 2018 for DDG 118-119 - Period of Performance FY16-FY21
N00024-13-C-5132: Sole source to support NJ Sites - Period of Performance FY13-FY18
Pending follow on contract planned to award 2ND QTR FY19 (N00024-18-C-5103)
N00024-17-C-5019: Life cycle logistics support - Period of Performance FY17-FY21
N00024-14-C-5104: Sole source to support ship installation and test - Period of Performance FY14-FY22
N00024-15-C-5151: AEGIS ship integration and test - Period of Performance FY15-FY25
ECP Pending to increase scope to incorporate High Energy Weapons and AEGIS Ashore - Planned Award 2ND QTR FY19

Pending New Contracts:
N00024-18-X-0343: GSA awarded to support strategic planning efforts - Planned Award 2ND QTR FY19
N00024-15-X-0584: AEGIS ILS life cycle support sustainment - Planned Award Date FEB 2020

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

N00024-17-X-0343: Surface Combatant CSEA - Planned Award Date DEC 2020

In addition, PEO IWS 1.0 leverages contracts of other organizations to support AEGIS Development. These include:
MDA - LM BMD Contract (AEGIS BL 5 2020/2023 DEV)
NAVSEA - JHU APL, SAIC, CACI, SI, TMB, and Engility (ENG/PSS/ESS)
SEA05C - IDT (DEV)

**E. Performance Metrics**

Major Milestones for AEGIS CRUISER BL 9 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 12 (BL 9.A2)):
In-Progress Review (IPR) #3 first quarter FY18.
In-Progress Review (IPR) #4 fourth quarter FY18
Engineering Assessment (EA) #1 fourth quarter FY18.
Engineering Assessment (EA) #2 second quarter FY19.
BL 9 2018 Combat System Certification Panel (CG variant)fourth quarter of FY18.*
*Shifted CSCP from 3rd quarter to 4th quarter FY18 due to additional scope and software defect corrections.
BL 9 2020 Combat System Certification Panel first quarter of FY20.

Major Milestones for AEGIS DESTROYER BL 9 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 16 / TECHNOLOGY INSERTION 12/12H/16 (BL 9.C2)):
BL 9 2018 Combat System Certification Panel (DDG variant) fourth quarter of FY18
BL 9 2020 In-Progress Review (IPR) #1 first quarter FY18.
BL 9 2020 In-Progress Review (IPR) #2 fourth quarter FY18.
BL 9 2018 Combat System Certification Panel (CSCP) TI12 Configuration fourth quarter FY18.
BL 9 2020 Engineering Assessment (EA) #1 fourth quarter FY18.
BL 9 2020 Engineering Assessment (EA) #2 second quarter FY19.
BL 9 2021 In-Progress Review (IPR) #1 second quarter FY19.
BL 9 2021 Engineering Assessment (EA) #1 fourth quarter FY19
BL 9 2020 Combat System Certification Panel (CSCP) TI12H Configuration first quarter FY20. *Corrected error on PB19 budget exhibit. Date was incorrectly shown as second quarter FY19.
BL 9 2021 Combat System Certification Panel (CSCP) TI16 Configuration first quarter FY21.
BL 9 2022 In-Progress Review (IPR) #1 first quarter FY20.
BL 9 2022 In-Progress Review (IPR) #2 fourth quarter FY20.
BL 9 2022 Engineering Assessment (EA) #1 first quarter FY21.
BL 9 2022 Combat System Certification Panel (CSCP) Configuration first quarter FY22.

Major Milestones for AEGIS FLT III DESTROYER BL 10 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 20 / TECHNOLOGY INSERTION 16):
Completed BL 10 Preliminary Design Review (PDR) first quarter FY18.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

Completed BL 10 2023 In-Progress Review #2 fourth quarter FY18.
BL 10 2023 In-Progress Review #3 second quarter FY19.
BL 10 2023 In-Progress Review #2 first quarter FY20.
BL 10 2023 In-Progress Review #2 fourth quarter FY20.
BL 10 2023 In-Progress Review #2 third quarter FY21.
BL 10 2023 Engineering Assessment (EA) first quarter FY22.
BL 10 2023 AEGIS Light-Off (ALO) second quarter FY22.
BL 10 2023 Combat System Certification Panel fourth quarter FY23.
Combat System Interface Support Equipment Delivery in fourth quarter FY18
*Made a number of corrections to the PB19 budget exhibit schedule to include:
- Removed the CDR in FY19 as we have shifted from a waterfall development strategy to an agile approach.
- Corrected the ALO date from the first quarter 2021 to the second quarter 2022
- Corrected the CSCP date from the second quarter 2023 to the fourth quarter 2023
- Corrected the Demo date (and changed the name from Demo to EA) from the second quarter 2022 to the first quarter 2022

Major Milestones for AEGIS DESTROYER BL 5 UPGRADES (PREVIOUSLY AEGIS BL 5.4 UPGRADE):
Completed BL 5.4 Phase 1 In-Progress Review (IPR) #2 third quarter FY18.
BL 5 2020 In-Progress Review (IPR) #3 first quarter FY19.
BL 5 2020 In-Progress Review (IPR) #4 third quarter FY19.
BL 5 2020 Engineering Assessment (EA) fourth quarter FY19.*
*Shifted from third quarter FY19 due to Congressional mark.
BL 5 2020 Combat System Certification Panel (CSCP) third quarter FY20.*
*Shifted from fourth quarter FY19 due to Congressional mark.
BL 5 2023 Kickoff (KO) first quarter FY19.
BL 5 2023 System Requirements Review (SRR) first quarter FY20.
BL 5 2023 In-Progress Review (IPR) #1 third quarter FY20.
BL 5 2023 In-Progress Review (IPR) #2 first quarter FY21.
BL 5 2023 In-Progress Review (IPR) #3 third quarter FY21.
BL 5 2023 In-Progress Review (IPR) #4 first quarter FY22.
BL 5 2023 Engineering Assessment (EA) fourth quarter FY22.
BL 5 2023 Combat System Certification Panel (CSCP) fourth quarter FY23.*
*Corrected CSCP date from second quarter FY22 to fourth quarter FY23.

Major Milestones for AEGIS MODE 4/5 Integration*:
AEGIS BL 5 2018 Upgrade In-Progress Review (IPR) #1 first quarter FY19.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

AEGIS BL 5 2018 Combat System Certification Panel fourth quarter FY19.
AEGIS BL 5 2018 (BMD 3.6) Combat System Certification Panel fourth quarter FY19.
AEGIS BL 5 2018 (BMD 4.0) Combat System Certification Panel first quarter FY20.
AEGIS BL 7 2019 In-Progress Review (IPR) #1 fourth quarter FY18.
AEGIS BL 7 2019 Combat System Certification Panel third quarter FY19.
AEGIS BL 9 2018 In-Progress Review (IPR) #1 first quarter FY18.
AEGIS BL 9 2018 In-Progress Review (IPR) #2 fourth quarter FY18.
AEGIS BL 9 2020 Engineering Assessment (EA) #1 fourth quarter FY18.
AEGIS BL 9 2020 Engineering Assessment (EA) #2 second quarter FY19.
AEGIS BL 9 2020 Combat System Certification Panel first quarter FY20.
*Modified PB19 schedule based on AEGIS BL deliveries vice completion of IFF integration phases.

Major Milestones for Combat System Test Bed (CSTB):
Computer Program Delivery #2 second quarter FY19.
Computer Program Delivery #4 first quarter FY22.
Computer Program Delivery #5 first quarter FY23.
Computer Program Delivery #6 first quarter FY24.

Major Milestones for TASK FORCE CYBER AWAKENING (TFCA):
Completed In-Progress Review (IPR) #4 second quarter FY18.
In-Progress Review (IPR) #5 fourth quarter FY18.
In-Progress Review (IPR) #6 second quarter FY19.
In-Progress Review (IPR) #7 fourth quarter FY19.
In-Progress Review (IPR) #8 second quarter FY20.
In-Progress Review (IPR) #9 fourth quarter FY20.
In-Progress Review (IPR) #10 second quarter FY21.
In-Progress Review (IPR) #11 fourth quarter FY21.
In-Progress Review (IPR) #12 second quarter FY22.

Major Milestones for Far Term Interoperability Improvement Plan (FTIIP):
FTIIP In-Progress Review (IPR) #2 fourth quarter FY18.
FTIIP In-Progress Review (IPR) #3 fourth quarter FY19.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | Project (Number/Name)<br>1447 / *Surf Combatant Combat System Imp* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | C/CPIF | Lockheed Martin : Moorestown, NJ | 2,655.238 | 256.512 | Oct 2017 | 269.728 | Oct 2018 | 294.905 | Oct 2019 | - | | 294.905 | Continuing | Continuing | Continuing |
| Systems Engineering | SS/CPFF | APL : Baltimore, MD | 105.662 | 13.080 | Oct 2017 | 21.482 | Oct 2018 | 21.594 | Oct 2019 | - | | 21.594 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Dahlgren, VA | 480.465 | 30.890 | Oct 2017 | 30.578 | Oct 2018 | 41.571 | Oct 2019 | - | | 41.571 | Continuing | Continuing | Continuing |
| Systems Engineering | SS/CPAF | BAE Systems : Rockville, MD | 62.133 | 5.320 | Oct 2017 | 5.521 | Oct 2018 | 5.921 | Oct 2019 | - | | 5.921 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPIF | Raytheon : St. Petersburg, FL | 0.000 | 0.000 | | 1.400 | Oct 2018 | 3.512 | Oct 2019 | - | | 3.512 | 0.000 | 4.912 | - |
| Systems Engineering | WR | NSWC : Port Hueneme, CA | 89.301 | 5.074 | Oct 2017 | 5.578 | Oct 2018 | 6.895 | Oct 2019 | - | | 6.895 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NWAS : Corona, CA | 38.050 | 3.854 | Oct 2017 | 4.082 | Oct 2018 | 4.152 | Oct 2019 | - | | 4.152 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | SPAWAR : San Diego, CA | 12.932 | 0.824 | Oct 2017 | 1.089 | Oct 2018 | 1.098 | Oct 2019 | - | | 1.098 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | Various : Various | 181.040 | 9.958 | Oct 2017 | 13.524 | Oct 2018 | 16.204 | Oct 2019 | - | | 16.204 | Continuing | Continuing | Continuing |
| Award fees | SS/CPAF | Lockheed Martin : Moorestown, NJ | 272.094 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Award fees | SS/CPAF | BAE Systems : Rockville, MD | 3.853 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Award fees | SS/CPAF | Alion Science : Washington DC | 2.920 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.920 | - |
| Award fees | WR | Various : Various | 9.741 | 0.350 | Oct 2017 | 0.386 | Oct 2018 | 0.458 | Oct 2019 | - | | 0.458 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPIF | Technology Service Corporation : Silver Spring , MD | 0.000 | 0.000 | | 0.432 | Oct 2018 | 0.463 | Oct 2019 | - | | 0.463 | 0.000 | 0.895 | - |
| | | **Subtotal** | 3,913.429 | 325.862 | | 353.800 | | 396.773 | | - | | 396.773 | Continuing | Continuing | N/A |

**Remarks**

Various Performing Activities consist of multiple performing activities with funding for each no greater than $1 million per year. These larger performing activities include CDSA Dam Neck and NSWC/Crane.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | Project (Number/Name)<br>1447 / *Surf Combatant Combat System Imp* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | Department of Interior : Boise, Idaho | 43.779 | 0.980 | Oct 2017 | 1.058 | Oct 2018 | 1.124 | Oct 2019 | - | | 1.124 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NAVAIR : Pax River, MD | 16.872 | 1.350 | Oct 2017 | 1.524 | Oct 2018 | 1.694 | Oct 2019 | - | | 1.694 | Continuing | Continuing | Continuing |
| Test and Evaluation | Various | PMRF : Hawaii, HI | 2.500 | 0.900 | Oct 2017 | 0.986 | Oct 2018 | 1.048 | Oct 2019 | - | | 1.048 | 0.000 | 5.434 | - |
| | | **Subtotal** | 63.151 | 3.230 | | 3.568 | | 3.866 | | - | | 3.866 | Continuing | Continuing | N/A |

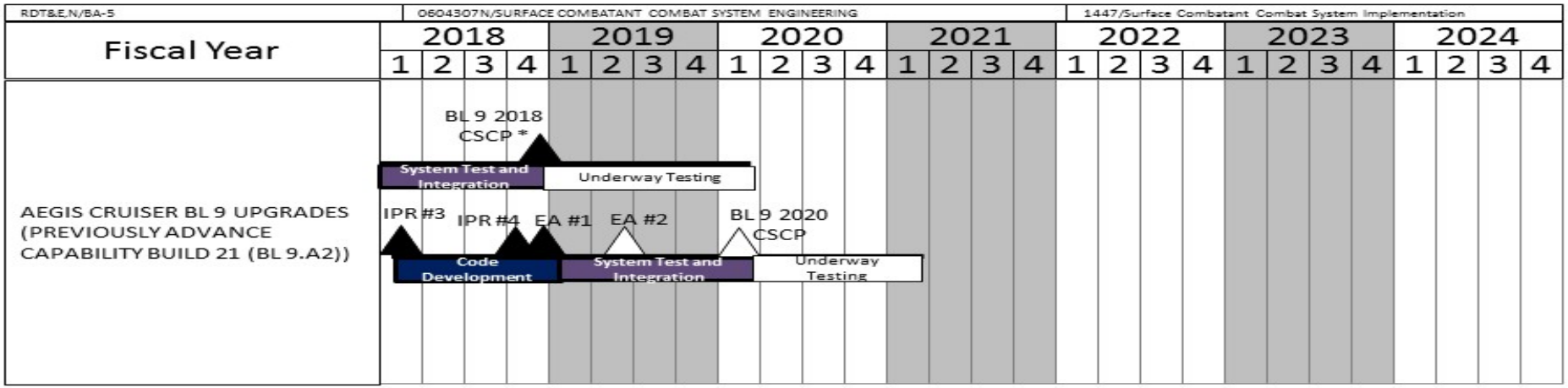
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | SS/CPAF | Alion Science : Washington DC | 31.437 | 1.350 | Oct 2017 | 1.532 | Oct 2018 | 1.624 | Oct 2019 | - | | 1.624 | Continuing | Continuing | Continuing |
| Program Management Support | SS/CPAF | SAIC : Mclean, VA | 22.138 | 2.601 | Oct 2017 | 3.270 | Oct 2018 | 3.284 | Oct 2019 | - | | 3.284 | Continuing | Continuing | Continuing |
| DAWDF | Various | Various : Various | 1.807 | 0.000 | Oct 2017 | 0.000 | Oct 2018 | 0.000 | Oct 2019 | - | | 0.000 | 0.000 | 1.807 | - |
| | | **Subtotal** | 55.382 | 3.951 | | 4.802 | | 4.908 | | - | | 4.908 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 4,031.962 | 333.043 | | 362.170 | | 405.547 | | - | | 405.547 | Continuing | Continuing | N/A |

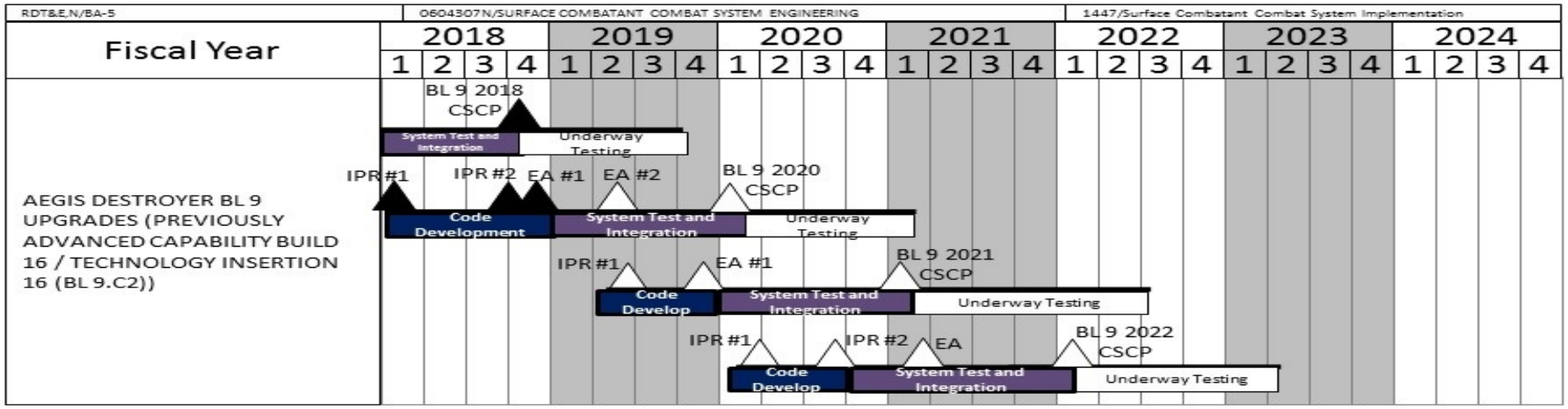
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



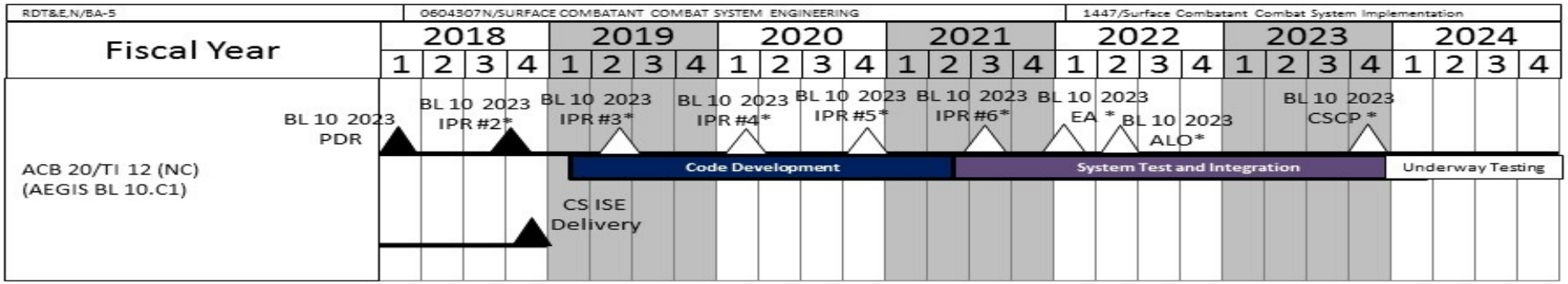

* PB19 to PB20 Changes:
Shifted CSCP date from the 3rd QTR. FY18 to the 4th QTR. FY18 due to additional scope and software defect corrections

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



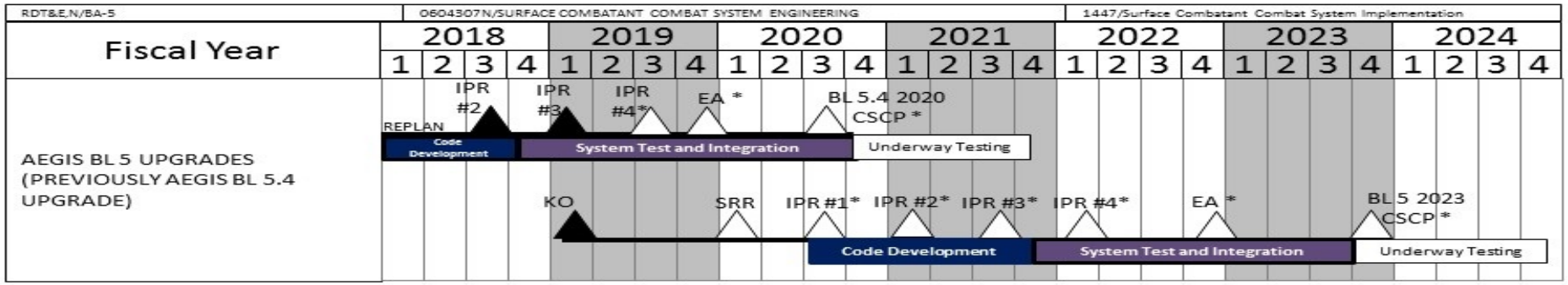

*PB19 to PB20 Changes:
Updated BL 9 2020 CSCP date from 2Q FY19 to 1Q FY20.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



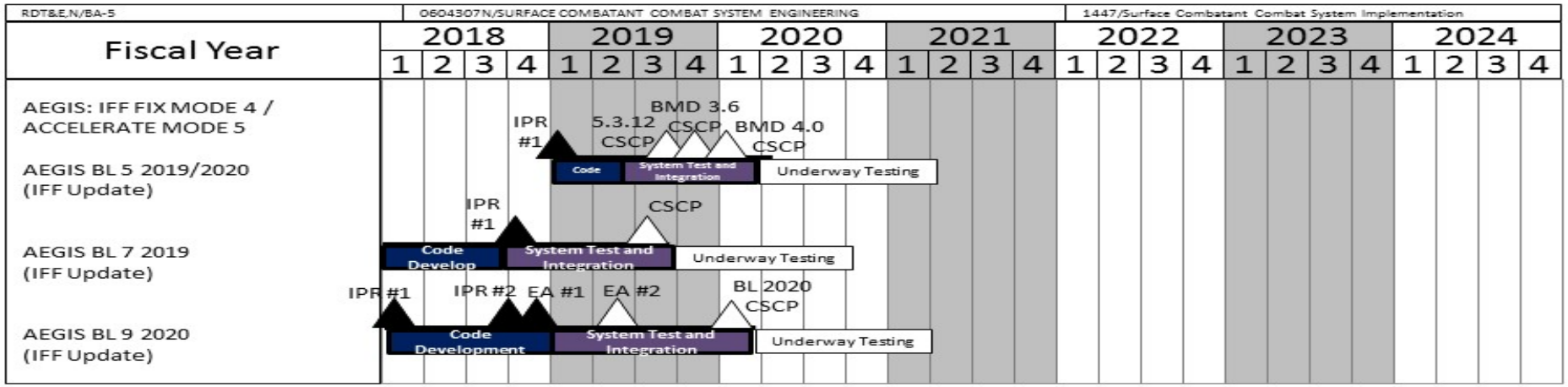

* PB19 to PB20 Changes:
Removed the CDR in FY19 as we have shifted from a waterfall development strategy to an agile approach.
Added In-Progress Review 2-6
Updated the ALO date from 1Q 2021 to 2Q FY22
Updated the CSCP date from 1Q 2021 to 2Q FY23
Updated the Demo date (and changed the name from Demo to EA) from 2Q FY22 to 1Q FY22

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



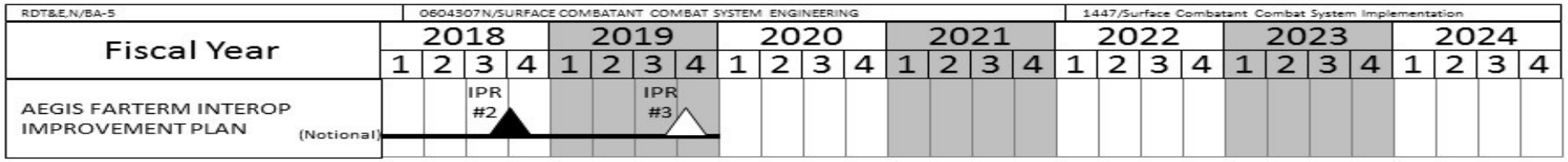

* PB19 to PB20 Changes:
Added BL 5 2020 IPR #4 in 3Q FY19
Shifted BL 5 2020 EA from 3Q FY19 to 4Q FY19 due to Congressional Reduction
Shifted BL 5 2020 CSCP from 4Q FY19 to 3Q FY20 due to Congressional Reduction
Removed BL 5 2023 IDR and PDR events shifting to IPR's – Added IPR's 1-4
Removed BL 5 2023 At-Sea Events
Removed BL 5 2023 FTM 27
Added BL 5 2023 EA in 4Q FY22
Updated BL 5 2023 CSCP date from 2Q FY22 to 4Q FY23

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



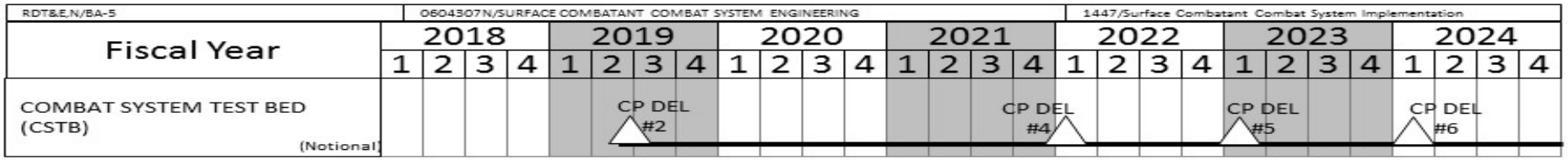

* PB19 to PB20 Changes:
Modified PB19 schedule based on AEGIS BL deliveries vice completion of IFF Integration phases.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

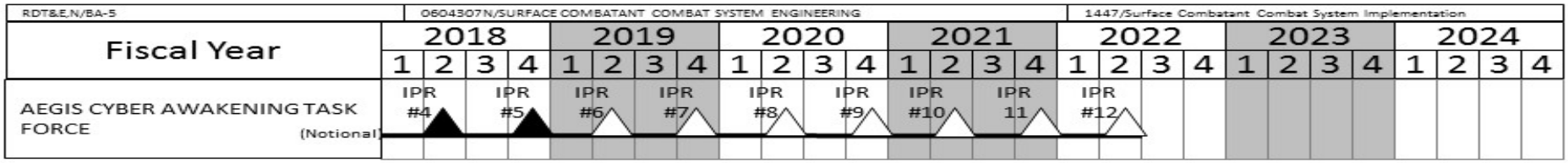



*PB19 to PB20 Changes:
Effort eliminated after FY19 due to funding higher priority efforts.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1447*** | | | | |
| AEGIS CRUISER BL 9 UPGRADES: IN-PROGRESS REVIEW #3 | 1 | 2018 | 1 | 2018 |
| AEGIS CRUISER BL 9 UPGRADES: IN-PROGRESS REVIEW #4 | 4 | 2018 | 4 | 2018 |
| AEGIS CRUISER BL 9 UPGRADES: ENGINEERING ASSESSMENT #1 | 4 | 2018 | 4 | 2018 |
| AEGIS CRUISER BL 9 UPGRADES: ENGINEERING ASSESSMENT #2 | 1 | 2019 | 1 | 2019 |
| AEGIS CRUISER BL 9 UPGRADES: COMPUTER PROGRAM CERTIFICATION PANEL BL 9 2018 | 2 | 2019 | 2 | 2019 |
| AEGIS CRUISER BL 9 UPGRADES: COMPUTER PROGRAM CERTIFICATION PANEL BL 9 2020 | 1 | 2020 | 1 | 2020 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2018 COMBAT SYSTEM CERTIFICATION PANEL (TI12) | 4 | 2018 | 4 | 2018 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2020 IN-PROGRESS REVIEW (IPR) #1 | 1 | 2018 | 1 | 2018 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2020 IN-PROGRESS REVIEW (IPR) #2 | 4 | 2018 | 4 | 2018 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2020 ENGINEERING ASSESSMENT (EA) #1 | 4 | 2018 | 4 | 2018 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2020 ENGINEERING ASSESSMENT (EA) #2 | 2 | 2019 | 2 | 2019 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2020 COMBAT SYSTEM CERTIFICATION PANEL (TI12H) | 1 | 2020 | 1 | 2020 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2021 IN-PROGRESS REVIEW (IPR) #1 | 2 | 2019 | 2 | 2019 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2021 ENGINEERING ASSESSMENT (EA) #1 | 4 | 2019 | 4 | 2019 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2021 COMBAT SYSTEM CERTIFICATION PANEL (TI16) | 1 | 2021 | 1 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2022 IN-PROGRESS REVIEW (IPR) #1 | 1 | 2020 | 1 | 2020 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2022 IN-PROGRESS REVIEW (IPR) #2 | 4 | 2020 | 4 | 2020 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2022 ENGINEERING ASSESSMENT (EA) #1 | 1 | 2021 | 1 | 2021 |
| AEGIS DESTROYER BL 9 UPGRADES: BL 9 2022 COMBAT SYSTEM CERTIFICATION PANEL (TI16) | 1 | 2022 | 1 | 2022 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 PRELIMINARY DESIGN REVIEW (PDR) | 1 | 2018 | 1 | 2018 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 IN-PROGRESS REVIEW (IPR) #2 | 1 | 2018 | 1 | 2018 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 IN-PROGRESS REVIEW (IPR) #3 | 2 | 2019 | 2 | 2019 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 IN-PROGRESS REVIEW (IPR) #4 | 1 | 2020 | 1 | 2020 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 IN-PROGRESS REVIEW (IPR) #5 | 4 | 2020 | 4 | 2020 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 IN-PROGRESS REVIEW (IPR) #6 | 3 | 2021 | 3 | 2021 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 ENGINEERING ASSESSMENT (EA) | 1 | 2022 | 1 | 2022 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 AEGIS LIGHT OFF (ALO) | 2 | 2022 | 2 | 2022 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: BL 10 2023 COMBAT SYSTEM CERTIFICATION PANEL (CSCP) | 4 | 2023 | 4 | 2023 |
| AEGIS FLT III DESTROYER BL 10 UPGRADES: CS ISE DELIVERY | 4 | 2018 | 4 | 2018 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2020 IN-PROGRESS REVIEW (IPR) #2 | 3 | 2018 | 3 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2020 IN-PROGRESS REVIEW (IPR) #3 | 1 | 2019 | 1 | 2019 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2020 IN-PROGRESS REVIEW (IPR) #4 | 3 | 2019 | 3 | 2019 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2020 ENGINEERING ASSESSMENT (EA) | 4 | 2019 | 4 | 2019 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2020 COMBAT SYSTEM CERTIFICATION PANEL (CSCP) | 4 | 2019 | 4 | 2019 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 KICK OFF (KO) | 1 | 2019 | 1 | 2019 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 SYSTEM REQUIREMENTS REVIEW (SRR) | 1 | 2020 | 1 | 2020 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 IN-PROGRESS REVIEW (IPR) #1 | 3 | 2020 | 3 | 2020 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 IN-PROGRESS REVIEW (IPR) #2 | 1 | 2021 | 1 | 2021 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 IN-PROGRESS REVIEW (IPR) #3 | 3 | 2021 | 3 | 2021 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 IN-PROGRESS REVIEW (IPR) #4 | 1 | 2022 | 1 | 2022 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 ENGINEERING ASSESSMENT (EA) | 4 | 2022 | 4 | 2022 |
| AEGIS DESTROYER BL 5 UPGRADES: AEGIS BL 5 2023 COMBAT SYSTEM CERTIFICATION PANEL (CSCP) | 4 | 2023 | 4 | 2023 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 5 2018 IN-PROGRESS REVIEW (IPR) #1 | 1 | 2019 | 1 | 2019 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 5 2018 COMBAT SYSTEM CERTIFICATION PANEL | 4 | 2019 | 4 | 2019 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 5 2018 (BMD 3.6) COMBAT SYSTEM CERTIFICATION PANEL | 4 | 2019 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 5 2018 (BMD 4.0) COMBAT SYSTEM CERTIFICATION PANEL | 1 | 2020 | 1 | 2020 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 7 2019 IN-PROGRESS REVIEW #1 | 4 | 2018 | 4 | 2018 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 7 2019 COMBAT SYSTEM CERTIFICATION PANEL | 3 | 2019 | 3 | 2019 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 9 2018 IN-PROGRESS REVIEW #1 | 1 | 2018 | 1 | 2018 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 9 2018 IN-PROGRESS REVIEW #2 | 4 | 2018 | 4 | 2018 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 9 2020 ENGINEERING ASSESSMENT (EA) #1 | 4 | 2018 | 4 | 2018 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 9 2020 ENGINEERING ASSESSMENT (EA) #2 | 2 | 2019 | 2 | 2019 |
| AEGIS IFF MODE 4/5 Integration: AEGIS BL 9 2020 COMBAT SYSTEM CERTIFICATION PANEL | 1 | 2020 | 1 | 2020 |
| COMBAT SYSTEM TEST BED (CTSB): CTSB BUILD #2 | 2 | 2019 | 2 | 2019 |
| COMBAT SYSTEM TEST BED (CTSB): CTSB BUILD #4 | 1 | 2022 | 1 | 2022 |
| COMBAT SYSTEM TEST BED (CTSB): CTSB BUILD #5 | 1 | 2023 | 1 | 2023 |
| COMBAT SYSTEM TEST BED (CTSB): CTSB BUILD #6 | 1 | 2024 | 1 | 2024 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #4 | 2 | 2018 | 2 | 2018 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #5 | 4 | 2018 | 4 | 2018 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #6 | 2 | 2019 | 2 | 2019 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #7 | 4 | 2019 | 4 | 2019 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #8 | 2 | 2020 | 2 | 2020 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #9 | 4 | 2020 | 4 | 2020 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #10 | 2 | 2021 | 2 | 2021 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #11 | 4 | 2021 | 4 | 2021 |
| TASK FORCE CYBER AWAKENING (TFCA): TFCA IN-PROGRESS REVIEW #12 | 2 | 2022 | 2 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>1447 / *Surf Combatant Combat System Imp* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| FAR TERM INTEROPERABILITY IMPROVEMENTS PLAN: FTIIP IN-PROGRESS REVIEW #2 | 4 | 2018 | 4 | 2018 |
| FAR TERM INTEROPERABILITY IMPROVEMENTS PLAN: FTIIP IN-PROGRESS REVIEW #3 | 4 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | Project (Number/Name)<br>3357 / *Aegis Training Improvement Program* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3357: *Aegis Training Improvement Program* | 37.479 | 7.717 | 6.946 | 10.078 | - | 10.078 | 8.898 | 7.968 | 6.139 | 5.348 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The AEGIS Training Improvement project provides enhancements and upgrades to the Total Ship Training Capability (TSTC) training components within the combat system to address needs for increased training capability and functionality in conjunction with AEGIS Advanced Capability Builds (ACB). These enhancements will address current and future training requirements by implementing new functionality to enable the individual warfighter through distributed battle group events to engage in more complex training requirements to support fleet required training certification events. Capability Development and integration are related to Integrated Air and Missile Defense, Underwater, Surface, and other warfare areas. Capability enhancements and upgrades include development of re-useable common components that can be leveraged by SSDS MK2 combat systems, and/or integration of re-usable common components developed by the TSTC Battle Force Tactical Trainer (BFTT) Program and Ship Self Defense System (SSDS) MK2 TSTC Training Improvement programs to meet AEGIS combat system training requirements. TSTC provides realistic joint warfare training across the spectrum of armed conflict, realistic unit level team training in all warfare areas (e.g. NIFC-CA and BMD missions to support IAMD). TSTC provides ships' Commanding Officers and Battle Group/Battle Force Commanders with the ability to conduct coordinated realistic, high stress, combat system level team training as an integral part of the Afloat Training Organization, the Tactical Training Groups and C2F/C3F Fleet Synthetic Trainers (FSTs). TSTC continues to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including COMPTUEX FST at Sea integration into Live, Virtual and Constructive (LVC) environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and SSDS combat system capability upgrades, and to address the Fleet's Live, Virtual and Constructive (LVC) Fleet Training Wholeness initiative. Additionally, modernization is needed to support the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan and Commander United States Fleet Forces Command Fleet Readiness Training Plan.

The Advanced Training Domain (ATD) is being developed to combine BFTT and the AEGIS Combat Training System (ACTS) into a common system that integrates with AEGIS BL 9.2.2AF, and SSDS BL 11.xAF. ATD is being hosted along with the AEGIS and SSDS combat system on TI-16 common processing and display hardware. ATD is being designed to be the core of the Total Ship Training Capability, and is projected to be more reliable, simpler to use, and architected to be extensible to meet interoperability and capability enhancement challenges in the future.

The BFTT is being updated to maintain integration and capability enhancements developed for the Cooperative Engagement Capability (CEC), Surface Electronic Warfare Improvement Program (SEWIP), and the Carrier Tactical Support Center (CV-TSC), and SSDS Fire Control Loop Improvement Program.

TSTC provides realistic joint warfare training across the spectrum of armed conflict, realistic unit level team training in all warfare areas (e.g. NIFC-CA and BMD missions to support IAMD). TSTC provides ships' Commanding Officers and Battle Group/Battle Force Commanders with the ability to conduct coordinated realistic, high stress, combat system level team training as an integral part of the Afloat Training Organization, the Tactical Training Groups and C2F/C3F FST/LVC events.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |

Develop and integrate MH-60R simulator to enable embedded shipboard training in support of basic and sustainment training, as well as establishes the pathway to support pier-side Fleet Synthetic Training (FST) events.

Develop and Integrate Cooperative Engagement Capability (CEC) Enhanced Training (CET) to support basic and sustainment level training, as well as provide ability to distribute and establish CEC data link during pier-side fleet synthetic training exercises. CET will also provide enable proficiency training of NIFC-CA capability.

Develop and integrate CEC Interim Training (CIT) capability to support pier-side fleet synthetic training events. This is an interim capability support the distributed portion of the CET capability, until CET is fully deployed. This supports training of strike groups of new tactical capabilities that were integrated into the AEGIS BL9 ships, and provides the necessary functionality to allow ships to train as a strike group.

Develop and integrate upgrades to Battle-Force Electronic Warfare Trainer (BEWT) to support soft kill training with NULKA.

Develop Identification Friend or Foe (IFF) simulator to enable training of Modes 1, 2, 3A, 4, C, 5 and S on both AEGIS and SSDS ships. Capability will support AEGIS and SSDS IFF MODE 4/5 Integration program will address training Mode 4 Inoculation, and allow training of Modes 5 and S IFF.

Develop and integrate commensurate training improvements to SSDS ACB 20 for Enhanced Sea Sparrow Missile (ESSM) and Electronic Warfare (EW) tactical improvements.

Integrate Navy Continuous Training Environment (NCTE) networking and cyber security upgrades maintain authorization to participate in distributed shipboard training events.

TSTC integrated on AEGIS provides the capability to complete system and operational level testing of the combat system.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AEGIS Training Improvement and ACB 16 Integration | 7.717 | 5.644 | 7.770 | 0.000 | 7.770 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** AEGIS Total Ship Training Capability (TSTC) provides enhancements to training components and increase training functionality in conjunction with AEGIS ACB16 development and integration. These enhancements will address current and future training requirements and implement new functionality to support more complex training requirements related to Underwater, Surface and other warfighter upgrades. | | | | | |
| ***FY 2019 Plans:***<br>AEGIS Modifications to support integration and testing of ATD and BFTT Integrated Training Improvements. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ATD 1.0: Deliver ATD 1.0 to support AEGIS BL 9 2021 and SSDS BL 11.x.<br><br>ATD 1.1: Conduct integration testing with AEGIS BL 10 2023. Develop and integrate Close-in Weapon System (CIWS) simulator and develop and integrate Gun Weapons System training capability to meet Aegis BL 10 2023 requirements.<br><br>BFTT 5.1.2: Deliver training capability to support SSDS Combat System FCLIP upgrades to include integration at CIWS Simulator leveraged from Aegis BL 10 2023 development.<br><br>ATD and BFTT: Continue to achieve interoperability with NCTE, AEGIS and SSDS Combat Systems; SLQ-32, SQQ-89, CV-TSC, SPQ-9B AMDR, EASR, and CEC PARM Elements.<br>***FY 2020 Base Plans:***<br>- Continue development, integration and testing of ATD on Aegis BL 10 2023and Ship Self Defense System (SSDS) BL 11.<br>- Develop changes to BFTT to incorporate ATD Human Machine Interface (HMI) to modernize BFTT on ships without TI 16 computing and display infrastructure.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase of 2.126M is caused by the support for the interoperability with NCTE, Aegis and SSDS Combat System. | | | | | |
| ***Title:*** Fleet Training Wholeness | 0.000 | 1.302 | 2.308 | 0.000 | 2.308 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Develop ECP's to implement ability for SPS-48, Next Generation Surface Search Radar (NGSSR) and SPQ-9B radars to process both simulated and live contacts.<br><br>Develop changes on AEGIS and SSDS baselines to allow training to overlay tactical displays to support training underway. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Develop of Surface Warfare Capability for integration on AEGIS.<br><br>Develop Cooperative Engagement Capability (CEC) Distributed Training Capability enhancements for training underway.<br><br>Assess safety and navigation distribution for underway training.<br><br>Develop data collection and after-action review tools for large events.<br><br>Develop surface search radar simulators.<br><br>Integrate shipboard synthetic tactical radios.<br><br>Develop weapon systems modifications to integrate LVC functionality and safety.<br><br>Initiate ATD 2.x and BFTT 5.2.x development efforts to integrate above capabilities.<br>***FY 2020 Base Plans:***<br>- Continue integration and testing of sim over live training improvements being developed with radars.<br>- Continue development of Advanced Training Domain (ATD) for Aegis BL 9 2021 and BL 10 2023.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $1.006M for Fleet Training Wholeness Strike Group. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.717 | 6.946 | 10.078 | 0.000 | 10.078 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTE/0204571N/1427: *Surface Tactical Team Trainer (STTT)* | 15.274 | 34.187 | 42.554 | - | 42.554 | 34.241 | 24.353 | 17.876 | 0.000 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Efforts will be completed on various contracts to support requirements updates to multiple products that will support Training Integration and Implementation within AEGIS ACB16.

**E. Performance Metrics**

Training Improvement Program efforts will complete major development milestones.
Major Milestones for AEGIS DESTROYER BL 9 UPGRADES (PREVIOUSLY ADVANCED CAPABILITY BUILD 16 / TECHNOLOGY INSERTION 12/12H/16 (BL 9.C2)):
BL 9 2018 Combat System Certification Panel (DDG variant) fourth quarter of FY18
BL 9 2020 In-Progress Review (IPR) #1 first quarter FY18.
BL 9 2020 In-Progress Review (IPR) #2 fourth quarter FY18.
BL 9 2018 Combat System Certification Panel (CSCP) TI12 Configuration fourth quarter FY18.
BL 9 2020 Engineering Assessment (EA) #1 fourth quarter FY18.
BL 9 2020 Engineering Assessment (EA) #2 second quarter FY19.
BL 9 2021 In-Progress Review (IPR) #1 second quarter FY19.
BL 9 2021 Engineering Assessment (EA) #1 fourth quarter FY19
BL 9 2020 Combat System Certification Panel (CSCP) TI12H Configuration first quarter FY20. *Corrected error on PB19 budget exhibit. Date was incorrectly shown as second quarter FY19
BL 9 2021 Combat System Certification Panel (CSCP) TI16 Configuration first quarter FY21.
BL 9 2022 In-Progress Review (IPR) #1 first quarter FY20.
BL 9 2022 In-Progress Review (IPR) #2 fourth quarter FY20.
BL 9 2022 Engineering Assessment (EA) #1 first quarter FY21.
BL 9 2022 Combat System Certification Panel (CSCP) Configuration first quarter FY22.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | Various | Various : Various | 18.962 | 4.098 | Dec 2017 | 3.696 | Dec 2018 | 6.822 | Dec 2019 | - | | 6.822 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 18.962 | 4.098 | | 3.696 | | 6.822 | | - | | 6.822 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering | Various | Various : Various | 16.420 | 2.991 | Dec 2017 | 2.592 | Dec 2018 | 2.578 | Dec 2019 | - | | 2.578 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 16.420 | 2.991 | | 2.592 | | 2.578 | | - | | 2.578 | Continuing | Continuing | N/A |

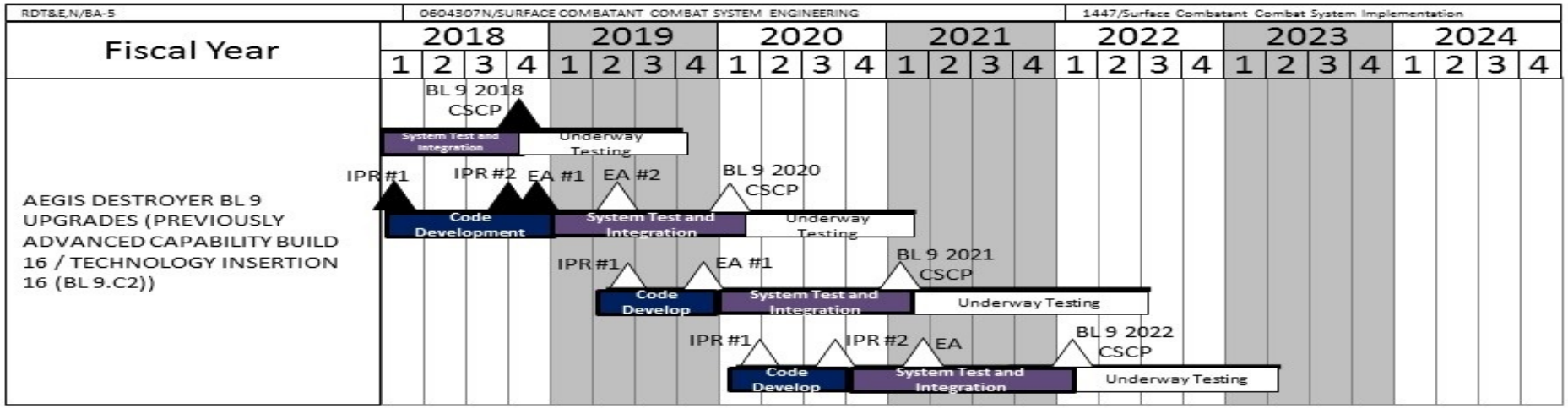
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Support | C/CPIF | CACI : Arlington, VA | 1.566 | 0.527 | Dec 2017 | 0.553 | Dec 2018 | 0.570 | Dec 2019 | - | | 0.570 | Continuing | Continuing | Continuing |
| Professional Support | C/CPIF | TMB : Washington DC | 0.531 | 0.101 | Dec 2017 | 0.105 | Dec 2018 | 0.108 | Dec 2019 | - | | 0.108 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.097 | 0.628 | | 0.658 | | 0.678 | | - | | 0.678 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 37.479 | 7.717 | | 6.946 | | 10.078 | | - | | 10.078 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |




*PB19 to PB20 Changes:
Updated BL 9 2020 CSCP date from 2Q FY19 to 1Q FY20.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>3357 / *Aegis Training Improvement Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3357*** | | | | |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.0) COMBAT SYSTEM CERTIFICATION PANEL (TI12) | 4 | 2018 | 4 | 2018 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.1) IN-PROGRESS REVIEW (IPR) #1 | 1 | 2018 | 1 | 2018 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.1) IN-PROGRESS REVIEW (IPR) #2 | 4 | 2018 | 4 | 2018 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.1) ENGINEERING ASSESSMENT #1 | 4 | 2018 | 4 | 2018 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.1) ENGINEERING ASSESSMENT #2 | 2 | 2019 | 2 | 2019 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.1) COMBAT SYSTEM CERTIFICATION PANEL (TI12H) | 1 | 2020 | 1 | 2020 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.2) IN-PROGRESS REVIEW (IPR) #1 | 2 | 2019 | 2 | 2019 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.2) ENGINEERING ASSESSMENT #1 | 4 | 2019 | 4 | 2019 |
| ACB16 BL 9.C2: ACB 16 (BL 9.C2.2) COMBAT SYSTEM CERTIFICATION PANEL (TI16) | 1 | 2021 | 1 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Provide System Engineering to evaluate Force Level Interoperability Improvements.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** AEGIS Force-Level Interoperability Definintion and Analysis | 0.000 | 10.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** Review and Evaluate potential solution to improve Combat System interoperability with in the AEGIS Platform and associated battlegroup configurations. | | |
| **Congressional Adds Subtotals** | 0.000 | 10.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTE/0604307N/1447: *AEGIS COMBABTANT COMBAT SYSTEM DEVELOPMENT AND INTEGRATION* | 333.043 | 362.170 | 405.547 | - | 405.547 | 353.019 | 317.337 | 282.960 | 282.776 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Major Milestones for AEGIS Force-Level Interoperability:
Contract Award (CA) third quarter FY19.
In-Progress Review fourth quarter FY19.
In Progress Review will provide current status of work being performed to study and evaluate potential changes to the AEGIS program to improve Force-Level Interoperability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

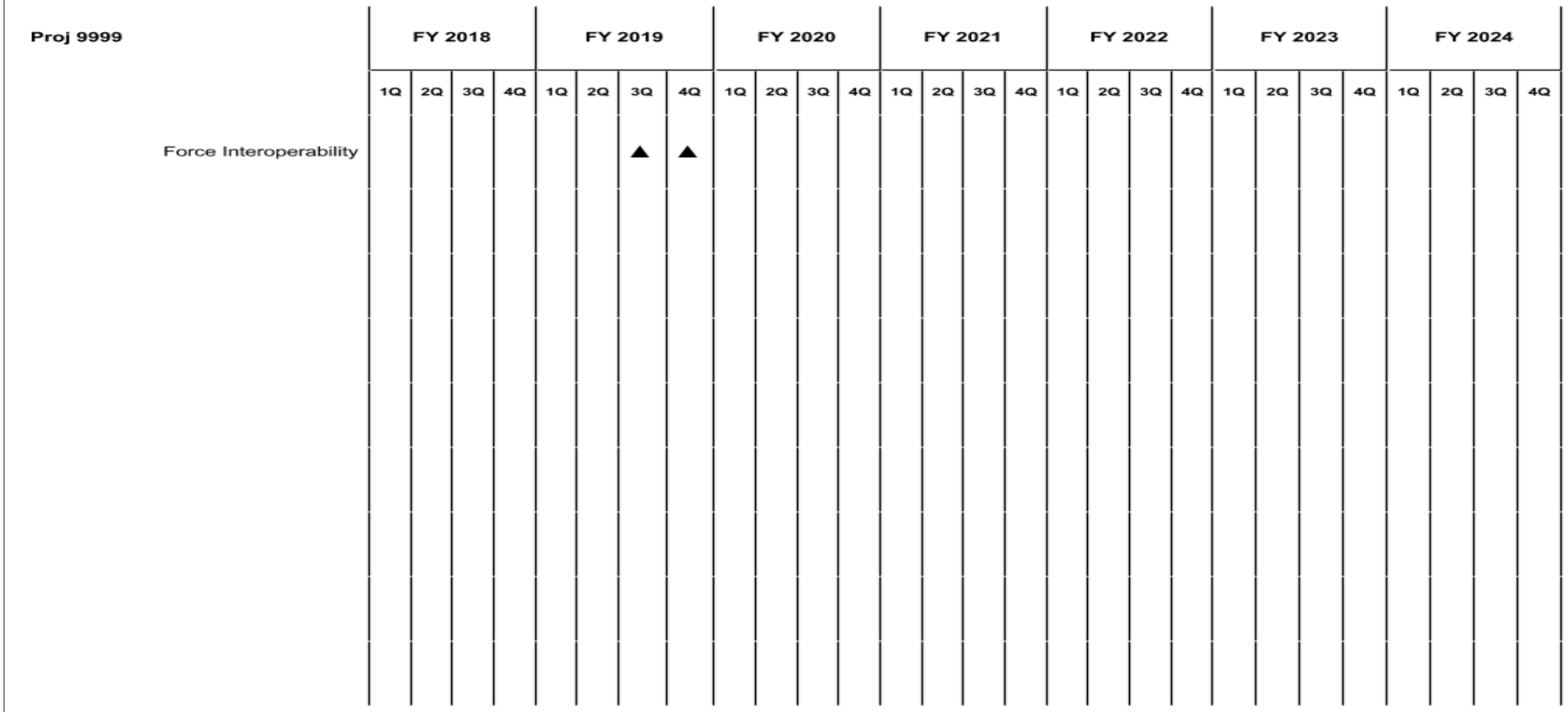
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TBD | C/BA | TBD : TBD | 0.000 | 0.000 | | 10.000 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 10.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604307N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604307N / *Surface Combatant Cmbt Sys Eng* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Force Interoperability: Contract Kickoff | 3 | 2019 | 3 | 2019 |
| Force Interoperability: In Progress Review | 4 | 2019 | 4 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604311N *I LPD-17 Class Systems Integration* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 34.101 | 0.665 | 0.939 | 0.640 | - | 0.640 | 0.945 | 0.916 | 0.844 | 0.861 | Continuing | Continuing |
| 2283: *LPD-17 Class System Integration* | 34.101 | 0.665 | 0.939 | 0.640 | - | 0.640 | 0.945 | 0.916 | 0.844 | 0.861 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $0.223M to account for the availability of prior year execution balances.

The LPD 17 Class ships are functional replacements for 41 ships of four classes of amphibious ships. These new ships embark, transport, and land elements of Marine landing forces in an assault by helicopters, landing craft, and amphibious vehicles. Tactics, techniques, and tools for naval expeditionary warfare continue to evolve. The LPD 17 Class configuration must continue to adapt to this evolutionary process, because these ships are expected to be in service until almost 2050. The LPD 17 design includes system configurations that reduce operating and support costs and facilitate operational performance improvements. System engineering and integration efforts that began in FY97 will develop further reductions in life cycle costs and will integrate performance upgrades in a rapid, affordable manner. Possible research and development investigations include improvements in Hull, Mechanical and Electrical systems, advanced sensors, advanced computers, advanced command and control software, advanced information system technologies, and ship based logistics support. Cost reduction and improved performance will be accomplished through sustained modeling and simulation efforts, resolutions of equipment obsolescence issues, prototype development, continued personnel reduction efforts, system performance tradeoff evaluations, and naval expeditionary warfare system engineering. Feedback from the Fleet for integrating system configurations will be accomplished through Naval Surface Warfare Centers (Philadelphia, Dahlgren, Port Hueneme, Panama City). These efforts will result in well defined specifications and drawings in system in system integration design packages that provide technical baseline for follow on ship procurements.

| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| Previous President's Budget | 0.689 | 0.939 | 0.863 | - | 0.863 |
| Current President's Budget | 0.665 | 0.939 | 0.640 | - | 0.640 |
| Total Adjustments | -0.024 | 0.000 | -0.223 | - | -0.223 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.024 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.223 | - | -0.223 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604311N *I LPD-17 Class Systems Integration* |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $0.223M to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604311N / *LPD-17 Class Systems Integration* | Project (Number/Name)<br>2283 / *LPD-17 Class System Integration* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2283: *LPD-17 Class System Integration* | 34.101 | 0.665 | 0.939 | 0.640 | - | 0.640 | 0.945 | 0.916 | 0.844 | 0.861 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The LPD 17 Class ships are functional replacements for 41 ships of four classes of amphibious ships. These new ships embark, transport, and land elements of Marine landing forces in an assault by helicopters, landing craft, and amphibious vehicles. Tactics, techniques, and tools for naval expeditionary warfare continue to evolve. The LPD 17 Class configuration must continue to adapt to this evolutionary process, because these ships are expected to be in service until almost 2050. The LPD 17 design includes system configurations that reduce operating and support costs and facilitate operational performance improvements. System engineering and integration efforts that began in FY97 will develop further reductions in life cycle costs and will integrate performance upgrades in a rapid, affordable manner. Possible research and development investigations include improvements in Hull, Mechanical and Electrical systems, advanced sensors, advanced computers, advanced command and control software, advanced information system technologies, and ship based logistics support. Cost reduction and improved performance will be accomplished through sustained modeling and simulation efforts, resolutions of equipment obsolescence issues, prototype development, continued personnel reduction efforts, system performance tradeoff evaluations, and naval expeditionary warfare system engineering. Feedback from the Fleet for integrating system configurations will be accomplished through Naval Surface Warfare Centers (Philadelphia, Dahlgren, Port Hueneme, Panama City). These efforts will result in well defined specifications and drawings in system in system integration design packages that provide technical baseline for follow on ship procurements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Engineering/Integration | 0.665 | 0.939 | 0.640 | 0.000 | 0.640 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continued Naval Expeditionary Warfare Systems Engineering efforts and integration efforts for unique LPD 17 Class systems, including efforts to resolve obsolescence issues impacting the LPD-17 class. | | | | | |
| ***FY 2019 Plans:***<br>- Continue to conduct Environmental Qualification Testing for new systems installed on LPD 28 such as, commercial motors, pumps and tankless water heaters.<br>- Complete USMC weapons stowage studies, and complete engineering design drawings.<br>- Complete SBIR Transparent Armored Window Phase II and transition to Phase III.<br>- Continue SBIR projects for LPD 17 Class Ships. Initiate Phase I projects and transition to Phase II or III.<br>- Complete SSDG Lube Oil & Fuel Oil Filter class designs.<br>- Complete Fiber Optic Cable Plat monitoring system via SBIR Phase III acquisition. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604311N / *LPD-17 Class Systems Integration* | **Project (Number/Name)**<br>2283 / *LPD-17 Class System Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Initiate energy savings study for Caterpillar Ship Service Diesel Generator (CAT SSDG) engine electronic fuel injection.<br>***FY 2020 Base Plans:***<br>- Continue environmental qualification testing for new systems and continue with the CAT SSDG engine savings project.<br>- Continue energy savings design and testing for CAT SSDG engine electronic fuel injection.<br>- Continue to investigate HME Obsolescence issues for LPD-28 and LPD-29.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $0.299M from FY 2019 to FY 2020 meets program requirements. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.665 | 0.939 | 0.640 | 0.000 | 0.640 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Continue developmental sole source efforts, improve quality and cost savings engineering studies.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604311N / *LPD-17 Class Systems Integration* | Project (Number/Name)<br>2283 / *LPD-17 Class System Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering and Integration | WR | NSWC Crane : Crane, IN | 13.236 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.236 | - |
| Systems Engineering and Integration | C/CPFF | Raytheon Comp : San Diego, CA | 2.432 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.432 | - |
| LSD(X) Systems Integration (Next Gen.) | C/CPFF | CSC, Alion Science : Washington, DC | 0.549 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.549 | - |
| LSD(X) Systems Integration (Next Gen.) | WR | NSWC Carderock, NSWC Dahlgren : NSWC Beth, MD; NSWC Dahlgren, VA | 0.100 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| DAWF | Various | Various : Various | 0.005 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.005 | - |
| Systems Engineering and Integration | C/CPFF | Huntington Ingalls Industries : Pascagoula, MS | 0.987 | 0.242 | Dec 2017 | 0.939 | Dec 2018 | 0.640 | Dec 2019 | - | | 0.640 | Continuing | Continuing | Continuing |
| Systems Engineering and Integration | WR | NSWC, Philadelphia : Philadelphia, PA | 1.015 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.015 | - |
| Systems Engineering and Integration | C/CPFF | ULTRA Communications : Vista, CA | 0.285 | 0.150 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Small Business Innovative Research | TBD | TBD : TBD | 0.000 | 0.038 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.038 | - |
| Systems Engineering and Integration | Various | ICI : TBD | 0.000 | 0.235 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.235 | - |
| | | **Subtotal** | 18.609 | 0.665 | | 0.939 | | 0.640 | | - | | 0.640 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OT&E/Interoperability | WR | OPTEVFOR : Norfolk, VA | 15.492 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.492 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604311N / *LPD-17 Class Systems Integration* | **Project (Number/Name)**<br>2283 / *LPD-17 Class System Integration* |

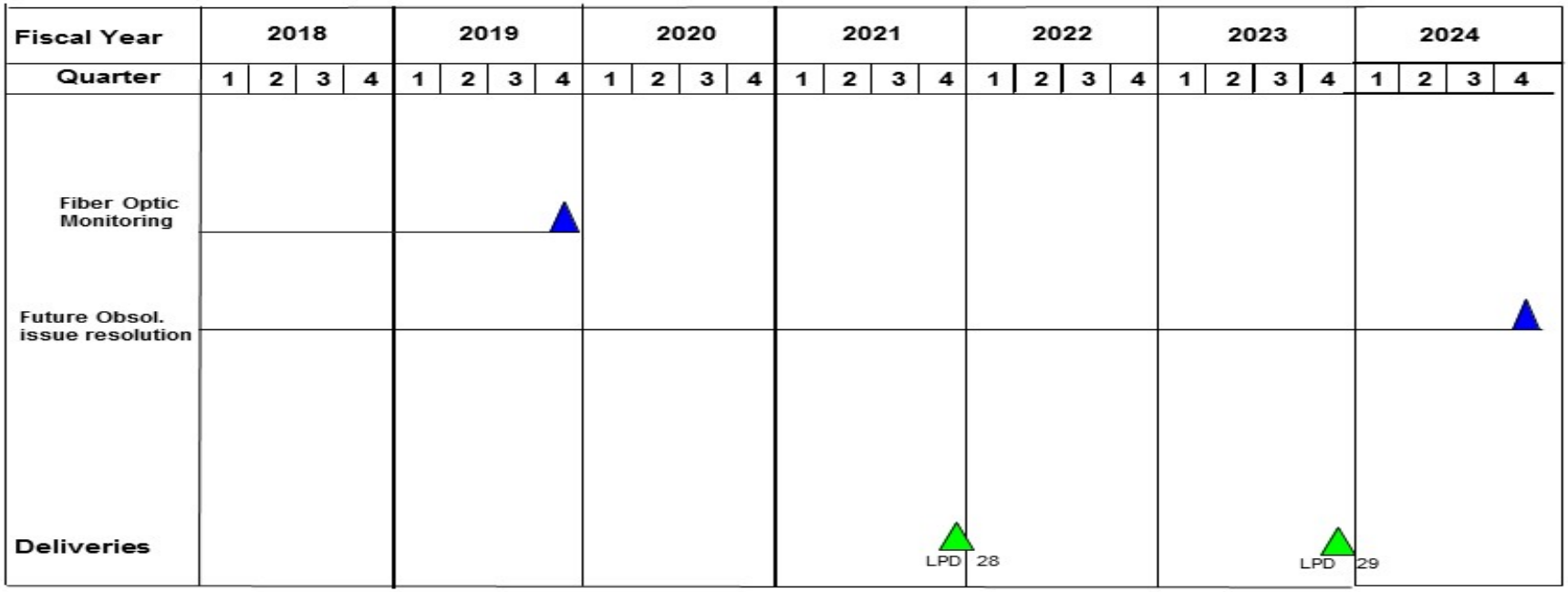
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 15.492 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.492 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 34.101 | 0.665 | | 0.939 | | 0.640 | | - | | 0.640 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604311N / *LPD-17 Class Systems Integration* | **Project (Number/Name)**<br>2283 / *LPD-17 Class System Integration* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604311N / *LPD-17 Class Systems Integration* | **Project (Number/Name)**<br>2283 / *LPD-17 Class System Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2283*** | | | | |
| Fiber Optic Monitoring | 4 | 2018 | 4 | 2019 |
| Future Obsol. Issue Resolution | 1 | 2018 | 4 | 2024 |
| Delivery (LPD 28) | 4 | 2021 | 4 | 2021 |
| Delivery (LPD 29) | 4 | 2023 | 4 | 2023 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604329N *I Small Diameter Bomb (SDB)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 364.555 | 99.286 | 96.980 | 50.096 | - | 50.096 | 77.197 | 55.663 | 48.185 | 49.146 | Continuing | Continuing |
| 1663: *SDB II F-18 Integration* | 98.371 | 47.282 | 31.875 | 3.947 | - | 3.947 | 8.177 | 4.581 | 3.088 | 3.147 | Continuing | Continuing |
| 3072: *Small Diameter Bomb (SDB)* | 216.831 | 47.451 | 65.105 | 46.149 | - | 46.149 | 69.020 | 51.082 | 45.097 | 45.999 | Continuing | Continuing |
| 3082: *JMM BRU* | 49.353 | 4.553 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 53.906 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 439 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

Small Diameter Bomb Increment II (SDB II) is an ACAT 1C joint Department of the Air Force (USAF) and Department of the Navy (DON) program, with the USAF as the lead service. The SDB II increases joint lethality in contested environments. The SDB can strike a diverse set of targets inside an adversary's air and missile defense networks to destroy mobile platforms through the weather. With increased loadout, range, and munitions effect the network enabled SDBII enhances close combat lethality in complex terrain and provides a net-centric operations capability. The BRU-61 is the Universal Armament Interface (UAI) rack used to carry four SDB II's at one time. The threshold aircraft for the USAF is the F-15E and for the DON are the F-35B and F-35C. F/A-18 E/F is an objective platform for the DoN.

The DON has adjusted the platform integration strategy through the inclusion of F/A-18 E/F using BRU-55 to deliver the capability to the warfighter aligned to adjusted F-35 program's schedule.

BUDGET ACTIVITY JUSTIFICATION: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604329N *I Small Diameter Bomb (SDB)* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 112.846 | 104.448 | 81.359 | - | 81.359 |
| Current President's Budget | 99.286 | 96.980 | 50.096 | - | 50.096 |
| Total Adjustments | -13.560 | -7.468 | -31.263 | - | -31.263 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -7.468 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -10.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -3.560 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -31.201 | - | -31.201 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.062 | - | -0.062 |

**Change Summary Explanation**

The FY 2020 request was reduced by $21.074M to account for the availability of prior year execution balances primarily as a result of unrealized SDB II weapon redesign in F35 integration. Funding also decreases from FY 2019 to FY 2020 as a result of the completion of Developmental Test and transition to Operational Test for SDB II F-18 Integration.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604329N / *Small Diameter Bomb (SDB)* | Project (Number/Name)<br>1663 / *SDB II F-18 Integration* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1663: *SDB II F-18 Integration* | 98.371 | 47.282 | 31.875 | 3.947 | - | 3.947 | 8.177 | 4.581 | 3.088 | 3.147 | Continuing | Continuing |
| Quantity of RDT&E Articles | 53 | 40 | 18 | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Due to continuing delays in the F-35 program, the DON has adjusted the platform integration strategy by inclusion of Small Diameter Bomb II (SDB II) and BRU-55 on F/A-18 E/F to deliver the capability to the warfighter in light of continued F-35 program delays. This program funds the aircraft software, integration, and testing required to successfully integrate SDB II and BRU-55 on the F/A-18 E/F to meet a FY 2020 Initial Operational Capability (IOC). In order to meet the IOC, testing will be limited to the F/A-18 E/F midboard stations. Following midboard station testing, the program will test SDB II and BRU-55 on inboard stations and the SDB II and BRU-61 four-place launcher on midboard and inboard stations.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** F/A-18 Integration | 47.282 | 31.875 | 3.947 | 0.000 | 3.947 |
| ***Articles:*** | 40 | 18 | - | - | - |
| ***FY 2019 Plans:***<br>Complete DT efforts for both weapon system and aircraft OFP. Contract with SDB Prime contractor for 15 SDB JTVs and 3 All Up Rounds (AUR) to support Operational Test which will begin in FY20. | | | | | |
| ***FY 2020 Base Plans:***<br>Execute Operational Test (OT). | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from 2019 to 2020 reflects the completion of Developmental Test and transition to Operational Test. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 47.282 | 31.875 | 3.947 | 0.000 | 3.947 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Integration of SDB II and the BRU-55 is software driven by ground and flight test requirements.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>1663 / *SDB II F-18 Integration* |

**E. Performance Metrics**

Earned value will be used for the contracted efforts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>1663 / *SDB II F-18 Integration* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OFP Development and Support | SS/IDIQ | Boeing : St. Louis, MO | 52.484 | 7.341 | Jan 2018 | 6.901 | Nov 2018 | 0.214 | Nov 2019 | - | | 0.214 | 1.619 | 68.559 | 68.559 |
| SDB II Prime Contractor Support | SS/IDIQ | Raytheon Missile Systems : Tuscon, AZ | 9.287 | 13.388 | Jun 2018 | 7.624 | Feb 2019 | 0.202 | Feb 2020 | - | | 0.202 | 6.110 | 36.611 | 36.611 |
| SDB II Integration Support | WR | NAWC AD : Patuxent River, MD | 5.530 | 0.600 | Nov 2017 | 2.023 | Nov 2018 | 0.154 | Dec 2019 | - | | 0.154 | Continuing | Continuing | Continuing |
| SDB II Software Support | WR | NAWC WD : China Lake, CA | 14.145 | 19.756 | Nov 2017 | 2.266 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | Continuing | Continuing | Continuing |
| JMM BRU Prime Contractor Support | SS/IDIQ | Raytheon Intelligence Information Systems, Inc. : Indianapolis, IN | 11.172 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.172 | 11.172 |
| | | **Subtotal** | 92.618 | 41.085 | | 18.814 | | 0.670 | | - | | 0.670 | Continuing | Continuing | N/A |

**Remarks**

Funding for Boeing includes software coding of Operational Flight Program Build, to include Universal Armament Interface (UAI) and F/A-18 E/F aircraft support required to meet the FY 2020 Initial Operating Capability (IOC). Incremental funding of contract award will support Operational Test (OT) which will begin first quarter FY 2020 as reflected on the R4. FY 2019 carryover funds will be used for support of FY 2020 efforts.

Funding for SDB II (Raytheon Missile Systems) Prime Contractor includes support of Super Hornet Integration efforts. Incremental funding of contract award will support Operational Test (OT) which will begin first quarter FY 2020. FY 2019 carryover funds will be used for support of FY 2020 efforts.

Contract with Raytheon Intelligence Information Systems (RIIS) terminated for convenience 19 October 2017.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wind Tunnel Test | MIPR | various : various | 4.875 | 3.250 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.125 | - |
| Development Test | WR | VX-23 : Patuxent River, MD | 0.000 | 2.947 | Jan 2018 | 6.597 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604329N / *Small Diameter Bomb (SDB)* | Project (Number/Name)<br>1663 / *SDB II F-18 Integration* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test | WR | VX-31 : China Lake, CA | 0.000 | 0.000 | | 6.464 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Operational Test | WR | COMOPTEVFOR : Norfolk, VA | 0.000 | 0.000 | | 0.000 | | 3.277 | Nov 2019 | - | | 3.277 | Continuing | Continuing | Continuing |
| Wind Tunnel Test | MIPR | NASA Ames : Moffett Field, CA | 0.878 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.878 | - |
| | | **Subtotal** | 5.753 | 6.197 | | 13.061 | | 3.277 | | - | | 3.277 | Continuing | Continuing | N/A |

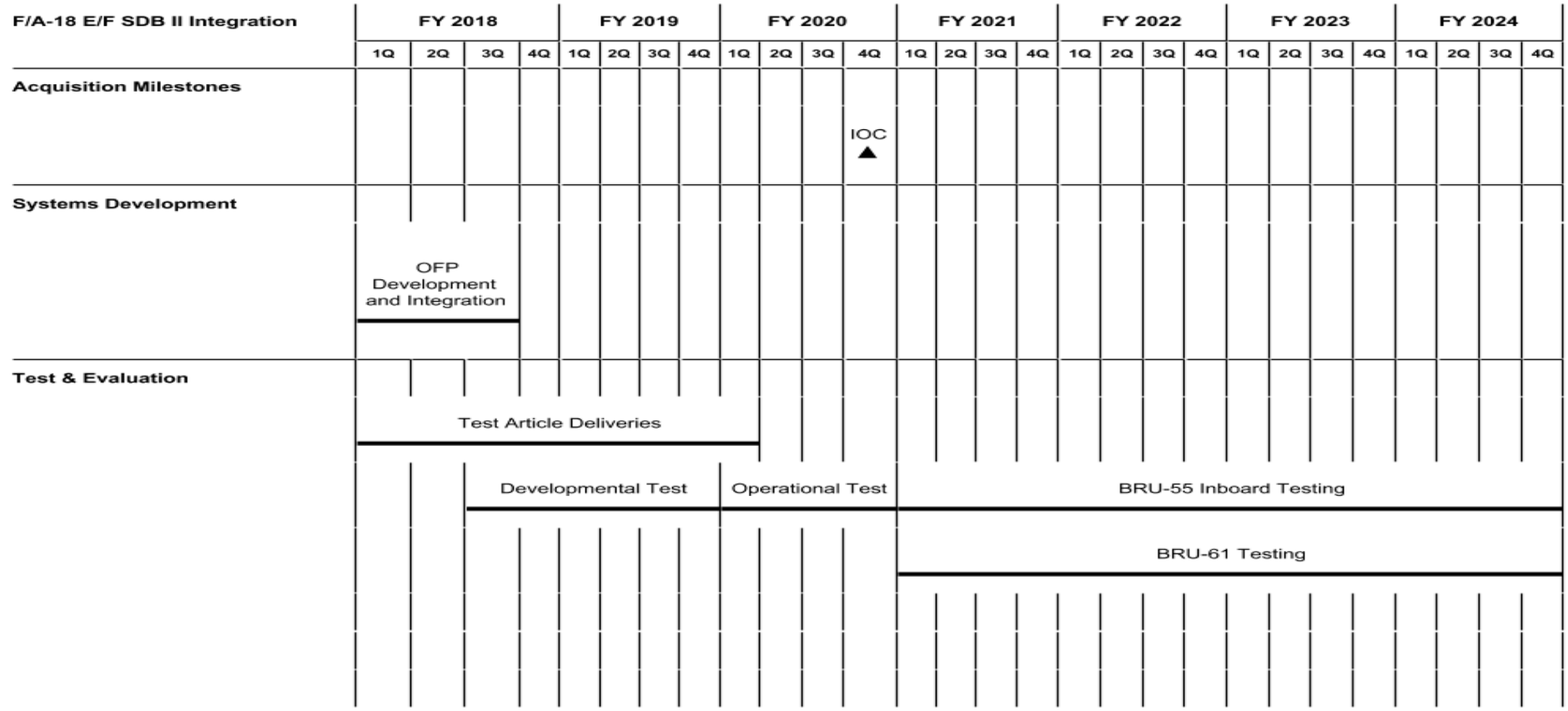
**Remarks**

Incremental funding will support Operational Test (OT) which will begin first quarter FY 2020 as reflected on the R4.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 98.371 | 47.282 | | 31.875 | | 3.947 | | - | | 3.947 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>1663 / *SDB II F-18 Integration* |




*2020PB - 0604329N - 1663*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>1663 / *SDB II F-18 Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***F/A-18 E/F SDB II Integration*** | | | | |
| Acquisition Milestones: IOC | 4 | 2020 | 4 | 2020 |
| Systems Development: OFP Development and Integration | 1 | 2018 | 3 | 2018 |
| Test & Evaluation: Test Article Deliveries | 1 | 2018 | 1 | 2020 |
| Test & Evaluation: Developmental Test | 3 | 2018 | 4 | 2019 |
| Test & Evaluation: Operational Test | 1 | 2020 | 4 | 2020 |
| Test & Evaluation: BRU-55 Inboard Station Testing | 1 | 2021 | 4 | 2024 |
| Test & Evaluation: BRU-61 Testing | 1 | 2021 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604329N / *Small Diameter Bomb (SDB)* | | | | Project (Number/Name)<br>3072 / *Small Diameter Bomb (SDB)* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3072: *Small Diameter Bomb (SDB)* | 216.831 | 47.451 | 65.105 | 46.149 | - | 46.149 | 69.020 | 51.082 | 45.097 | 45.999 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 439

**A. Mission Description and Budget Item Justification**

Small Diameter Bomb Increment II (SDB II) is an ACAT 1C joint Department of the Air Force (USAF) and Department of the Navy (DON) program, with the USAF as the lead service. The SDB II increases joint lethality in contested environments. The SDB can strike a diverse set of targets inside an adversary's air and missile defense networks to destroy mobile platforms through the weather. With increased loadout, range, and munitions effect the network enabled SDBII enhances close combat lethality in complex terrain and provides a net-centric operations capability. The BRU-61 is the Universal Armament Interface (UAI) rack used to carry four SDB II's at one time. The threshold aircraft for the USAF is the F-15E and for the DON are the F-35B and F-35C.

This Project Unit includes all funding for DoN support on the DoN threshold platforms, F-35B and F-35C. The USMC requirement to field SDB II on F-35B is in F-35 Operational Flight Plan (OFP) Block 4.1. The F-35C is being conducted as part of Block 4.2. Commencing FY 2018, the F-35 integration will be using BRU-61 vice BRU-77 to carry the SDB II.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** SDB II Weapon Support | 25.948 | 35.157 | 31.927 | 0.000 | 31.927 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding provides for SDB II Engineering Manufacturing and Development (EMD) efforts including weapon vendor support (Raytheon Missile Systems - RMS), test assets, and government support. Test articles were procured in prior years as part of a joint buy with the Air Force for a better priced quantity buy. | | | | | |
| ***FY 2019 Plans:***<br>Begin Flight Sciences and Flight Test support and analysis for Development Test (DT). Testing includes, ejection tests, environmental & loads analysis and release envelope clearance. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue Flight Sciences and Flight Test support and analysis for Development Test (DT). Testing includes, ejection tests, environmental & loads analysis and release envelope clearance. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3072 / *Small Diameter Bomb (SDB)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 reflects changes in Developmental Test (DT) and related support due to unrealized weapon redesign efforts and availability of prior year execution balances. | | | | | |
| ***Title:*** JSF Integration | 21.503 | 29.948 | 14.222 | 0.000 | 14.222 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding provided for integration of SDB II on F-35B and F-35C, specifically for Lockheed Martin to develop F-35 Operational Flight Program (OFP) software, flight missions, and support and analysis of missions.<br>***FY 2019 Plans:***<br>Conduct F-35 OFP Block 4 Flight Sciences which conducts aircraft environment test, Ground Vibration, and Jettison testing to prove the weapon can safely separate from the aircraft without damaging the aircraft and establishes weapon carriage and release envelopes. Begin DT flights.<br>***FY 2020 Base Plans:***<br>Continue F-35 OFP Block 4 Flight Sciences which conducts aircraft environment test, Ground Vibration, and Jettison testing to prove the weapon can safely separate from the aircraft without damaging the aircraft and establishes weapon carriage and release envelopes. Continue DT flights.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 is due to the completion of Universal Armament Interface (UAI) software coding in FY 2019 and to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 47.451 | 65.105 | 46.149 | 0.000 | 46.149 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTE,AF/0604329F: *Small Diameter Bomb* | 38.979 | 73.158 | 31.241 | - | 31.241 | 17.311 | 27.427 | 27.927 | 28.430 | 0.000 | 1,339.472 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3072 / *Small Diameter Bomb (SDB)* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • MPAF/0207327F: *Small Diameter Bomb* | 82.705 | 72.506 | 143.935 | - | 143.935 | 336.512 | 310.233 | 324.740 | 0.000 | 0.000 | 1,362.992 |
| • WPN/BLI2238: *Small Diameter Bomb II* | 20.968 | 91.272 | 118.466 | - | 118.466 | 114.710 | 116.981 | 119.455 | 121.840 | 74.439 | 778.131 |
| • APN/BLI0720: *War Consumables* | 0.000 | 0.000 | 17.247 | - | 17.247 | 17.381 | 17.726 | 17.820 | 18.176 | Continuing | Continuing |

**Remarks**

SDB II Lots 1-3 are USAF only procurements. The DON procurements begin with Lot 4 in FY 2018.

APN funding is the BRU-61 line within the 0720 BLI.

**D. Acquisition Strategy**

The SDB II acquisition strategy was to conduct a full and open competition to select up to two contractors to compete during a planned 42-month risk reduction phase prior to entering EMD. This competition began April 17, 2006 with the signature of contracts to the competing contractors: 1) Raytheon and 2) the team of Boeing and Lockheed Martin. A Fixed Price Incentive Firm Target type contract for EMD, including Firm Fixed Price procurement options for Lots 1-3 was awarded to Raytheon August 9, 2010. Lots 4 & 5 are included in the contract, but are Not-To-Exceed options. Milestone C was approved 4 June 2015, with Lot 1 (Air Force only) awarded 12 June 2015. Lot 4 is the first DoN procurement and was awarded April 2018 for 90 DoN weapons. Lot 5 was awarded 18 December 2018 for 750 DoN weapons.

The Navy funding will support Navy-unique efforts for SDB Increment II, such as aircraft integration, ship suitability, studies and analysis, and program management and government in-house support. These efforts will be performed on several cost-type contracts or through cost reimbursable work requests to government activities and contractors.

**E. Performance Metrics**

Earned value management has been implemented on the EMD contract with Raytheon.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3072 / *Small Diameter Bomb (SDB)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - SDB II EMD | C/FPIF | Raytheon : Tucson, AZ | 38.114 | 24.002 | Mar 2018 | 20.147 | Mar 2019 | 10.754 | Mar 2020 | - | | 10.754 | 27.621 | 120.638 | 120.638 |
| Aircraft Integration - JSF | C/CPFF | Lockheed Martin : Fort Worth, TX | 36.825 | 3.000 | Mar 2018 | 0.163 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 39.988 | 39.988 |
| Prior year Prod Dev cost no longer funded in the FYDP | Various | Various : Various | 11.238 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.238 | - |
| Hardware Development - BRU-61 | C/CPFF | Boeing : St. Charles, MO | 4.259 | 0.000 | | 5.000 | Mar 2019 | 7.000 | Mar 2020 | - | | 7.000 | 13.000 | 29.259 | 29.259 |
| | | **Subtotal** | 90.436 | 27.002 | | 25.310 | | 17.754 | | - | | 17.754 | 40.621 | 201.123 | N/A |

**Remarks**

Primary Hardware Development to Raytheon in Tucson, AZ reflects the SDB II prime contractor and includes test assets and contractor costs to support F-35 integration.
Funding for Lockheed Martin F-35 includes Associate Contractor Agreements (ACA), bay modifications, logistics efforts, and adapter hardware. It does not include OFP, UAI software coding, nor test missions which are represented in Support and Test sections, respectively.
Funding to Boeing for BRU-61 modifications required to carry SDB II on Navy and Marine Corps aircraft. Prior year efforts were to provide data and support to the BRU-77 contractor.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development - JSF | C/CPFF | Lockheed Martin : Ft. Worth, TX | 30.525 | 4.677 | Jan 2018 | 11.046 | Jan 2019 | 12.843 | Jan 2020 | - | | 12.843 | 33.673 | 92.764 | 92.764 |
| Prior year Support cost no longer funded in the FYDP | Various | Various : Various | 17.410 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.410 | - |
| | | **Subtotal** | 47.935 | 4.677 | | 11.046 | | 12.843 | | - | | 12.843 | 33.673 | 110.174 | N/A |

**Remarks**

Studies and Analyses include Navy activities to define Concept of Operations (CONOPS) and better define Navy-specific and interoperability requirements, such as weapon data link advanced concept technology demonstration, seeker trade studies, and data link trade studies. Prior year Software Development efforts are in support of JSuW Joint Capability Technology Demonstrations incorporation of J.11 Message Set into Strike Weapons and Weapon Data Link Network efforts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604329N / *Small Diameter Bomb (SDB)* | Project (Number/Name)<br>3072 / *Small Diameter Bomb (SDB)* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development for F-35 is the UAI, OFP, and mission planning which supports the SDB II program. | | | | | | | | | | | | | | | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | Various | Various : Various | 4.717 | 0.000 | | 7.842 | Nov 2018 | 7.093 | Nov 2019 | - | | 7.093 | 21.002 | 40.654 | - |
| Operational Test & Evaluation - SDBII | WR | COMOPTEVFOR : China Lake, CA | 1.010 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 23.959 | 24.969 | - |
| Developmental Test & Evaluation - SDB II | C/CPFF | Lockheed Martin : Ft. Worth, TX | 0.000 | 1.907 | Mar 2018 | 14.739 | Mar 2019 | 3.517 | Mar 2020 | - | | 3.517 | 7.782 | 27.945 | 27.945 |
| Prior Year T&E cost no longer funded in the FYDP | Various | Various : Various | 8.049 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.049 | - |
| RMS Flight Test Support | C/CPFF | Raytheon Missile Systems : Tucson, AZ | 0.000 | 4.273 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.273 | - |
| | | **Subtotal** | 13.776 | 6.180 | | 22.581 | | 10.610 | | - | | 10.610 | 52.743 | 105.890 | N/A |

**Remarks**

Developmental Test (DT) and Operational Test (OT) include all aspects of the weapon system - SDB II, BRU-61, and F-35B and F-35C aircraft OFP.
Developmental Test squadrons and locations for F-35B and F-35C are still uncertain as squadrons are being established. Incremental funding of contract awards will support Developmental Test (DT) which begins in the fourth quarter FY 2019 as reflected on the R4.

Raytheon will perform Captive Flight Test (CFT) to gather seeker data to be used during DT. The Air Force conducted CFT prior to F-15 DT.

Operational test is scheduled to begin in FY 2021 to support FY 2022 IOC.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Services | Various | Various : Various | 3.877 | 0.772 | Nov 2017 | 0.691 | Nov 2018 | 0.457 | Nov 2019 | - | | 0.457 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3072 / *Small Diameter Bomb (SDB)* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Support | WR | NAWC WD : China Lake,CA | 33.662 | 3.702 | Nov 2017 | 2.422 | Nov 2018 | 2.725 | Nov 2019 | - | | 2.725 | Continuing | Continuing | Continuing |
| Government Support | WR | Various : Various | 11.993 | 2.547 | Nov 2017 | 0.750 | Nov 2018 | 0.125 | Nov 2019 | - | | 0.125 | Continuing | Continuing | Continuing |
| Program Management Support | WR | Various : Various | 12.891 | 2.532 | Nov 2017 | 2.225 | Nov 2018 | 1.555 | Nov 2019 | - | | 1.555 | Continuing | Continuing | Continuing |
| Travel | WR | NAVAIR : Patuxent River, MD | 2.261 | 0.039 | Oct 2017 | 0.080 | Oct 2018 | 0.080 | Oct 2019 | - | | 0.080 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 64.684 | 9.592 | | 6.168 | | 4.942 | | - | | 4.942 | Continuing | Continuing | N/A |

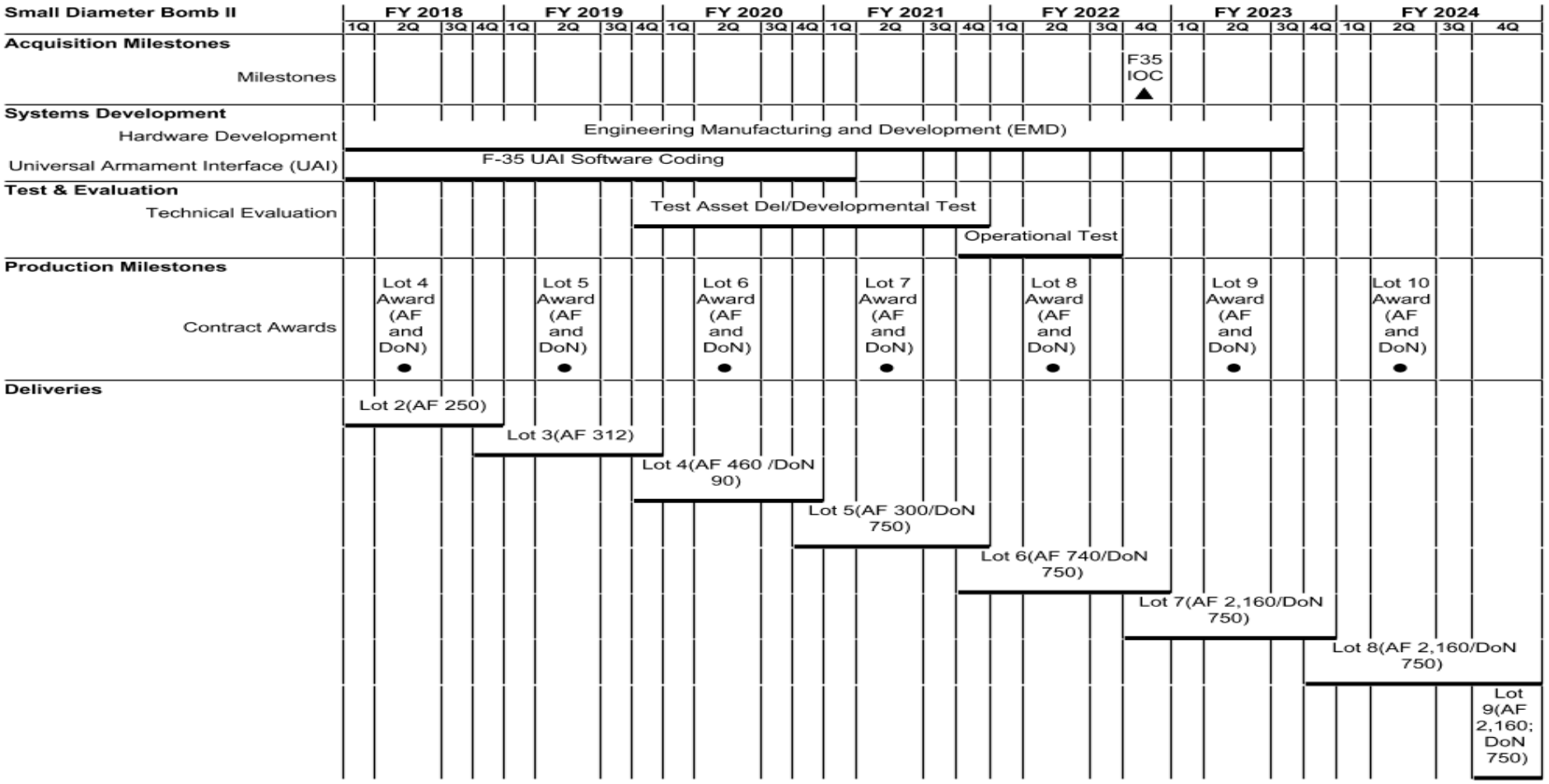
**Remarks**

Increase in FY 2019 for government support provides support for Development Test which is scheduled to begin fourth quarter FY 2019.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 216.831 | 47.451 | | 65.105 | | 46.149 | | - | | 46.149 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3072 / *Small Diameter Bomb (SDB)* |




*2020PB - 0604329N - 3072*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3072 / *Small Diameter Bomb (SDB)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Small Diameter Bomb II*** | | | | |
| Acquisition Milestones: Milestones: F-35 IOC | 4 | 2022 | 4 | 2022 |
| Systems Development: Hardware Development: Engineering Manufacturing and Development (EMD) | 1 | 2018 | 3 | 2023 |
| Systems Development: Universal Armament Interface (UAI): F-35 OFP Software Coding | 1 | 2018 | 1 | 2021 |
| Test & Evaluation: Technical Evaluation: Test Asset Deliveries/Developmental Test | 4 | 2019 | 4 | 2021 |
| Test & Evaluation: Technical Evaluation: Operational Test | 4 | 2021 | 3 | 2022 |
| Production Milestones: Contract Awards: Lot 4 Award (AF and DoN) | 2 | 2018 | 2 | 2018 |
| Production Milestones: Contract Awards: Lot 5 Award (AF and DoN) | 2 | 2019 | 2 | 2019 |
| Production Milestones: Contract Awards: Lot 6 Award (AF and DoN) | 2 | 2020 | 2 | 2020 |
| Production Milestones: Contract Awards: Lot 7 Award (AF and DoN) | 2 | 2021 | 2 | 2021 |
| Production Milestones: Contract Awards: Lot 8 Award (AF and DoN) | 2 | 2022 | 2 | 2022 |
| Production Milestones: Contract Awards: Lot 9 Award (AF and DoN) | 2 | 2023 | 2 | 2023 |
| Production Milestones: Contract Awards: Lot 10 Award (AF and DoN) | 2 | 2024 | 2 | 2024 |
| Deliveries: Lot 2 Del (AF only 250 units) | 1 | 2018 | 4 | 2018 |
| Deliveries: Lot 3 Del (AF only 312 units) | 4 | 2018 | 4 | 2019 |
| Deliveries: Lot 4 Del (AF 460; DoN 90 units) | 4 | 2019 | 4 | 2020 |
| Deliveries: Lot 5 Del (AF 300; DoN 750 units) | 4 | 2020 | 4 | 2021 |
| Deliveries: Lot 6 Del (AF 740; DoN 750 units) | 4 | 2021 | 4 | 2022 |
| Deliveries: Lot 7 Del (AF 2,160; DoN 750 units) | 4 | 2022 | 4 | 2023 |
| Deliveries: Lot 8 Del (AF 2,160; DoN 750 units) | 4 | 2023 | 4 | 2024 |
| Deliveries: Lot 9 Del (AF 2,160; DoN 750 units) | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604329N / *Small Diameter Bomb (SDB)* | Project (Number/Name)<br>3082 / *JMM BRU* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3082: *JMM BRU* | 49.353 | 4.553 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 53.906 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Joint Miniature Munitions Bomb Rack Unit (JMM BRU) is an Air Force (AF) led ACAT III program. It is required for the Department of the Navy's (DON) carriage of the SDB II weapon in the internal bay of the F-35B and F-35C and operation in the DON environment. The SDB II Capability Development Document (CDD) states that SDB II must be operable on the Miniature Munitions Smart Rack BRU-61/A. The BRU-61/A, currently in sustainment for the AF, does not meet the needs to operate with SDB II within the F-35 internal bay in the DON environment. The JMM BRU (BRU-77) fills the capability gap required by the DON. Efforts include development of a dual power capability to meet the SDB II operating environment on the F-35. The USMC requirement to field SDB II on F-35B is in F-35 Operational Flight Plan (OFP) Block 4.1. The F-35C is being conducted as part of Block 4.2.

The BRU-77 contract was terminated for convenience 19 Oct 2017. FY 2018 funding remains for termination costs. The requirement will now be supported by BRU-61 budgeted within PU 3072.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint Miniature Munitions Bomb Rack (JMM BRU) Prime Contractor | 4.553 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Prime Contractor Support of JMM BRU (BRU-77) TD/EMD contract. | | | | | |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.553 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3082 / *JMM BRU* |

**C. Other Program Funding Summary ($ in Millions)**

**Remarks**

**D. Acquisition Strategy**

The JMM BRU is an Air Force led ACAT III program. Competitive source selection conducted with Technology Development contract award 3QFY 2013. Milestone B was completed and Engineering, Manufacturing, and Development (EMD) contract awarded 4QFY 2015.

**E. Performance Metrics**

Earned value management is being implemented on the TD/EMD contract.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3082 / *JMM BRU* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Joint Miniature Munitions Bomb Rack Unit (JMM BRU) | C/FPIF | Raytheon Technical Services Company LLC : Indianapolis, IN | 26.245 | 4.553 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 30.798 | 30.798 |
| | | **Subtotal** | 26.245 | 4.553 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 30.798 | N/A |

**Remarks**

JMM BRU contract with Raytheon Intelligence Information Systems (RIIS, formerly RTSC) was terminated for convenience 19 October 2017. FY 2018 funding remains for contract termination costs.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAATS | Various | NAWC AD : Lakehurst | 2.517 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.517 | - |
| | | **Subtotal** | 2.517 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.517 | N/A |

**Remarks**

JMM BRU contract with Raytheon Intelligence Information Systems (RIIS, formerly RTSC) was terminated for convenience 19 October 2017. FY 2018 funding remains for contract termination costs.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flight Test | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | N/A |

**Remarks**

JMM BRU contract with Raytheon Intelligence Information Systems (RIIS, formerly RTSC) was terminated for convenience 19 October 2017. FY 2018 funding remains for contract termination costs.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3082 / *JMM BRU* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Support | Various | Various : Various | 20.591 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.591 | - |
| | | **Subtotal** | 20.591 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.591 | N/A |

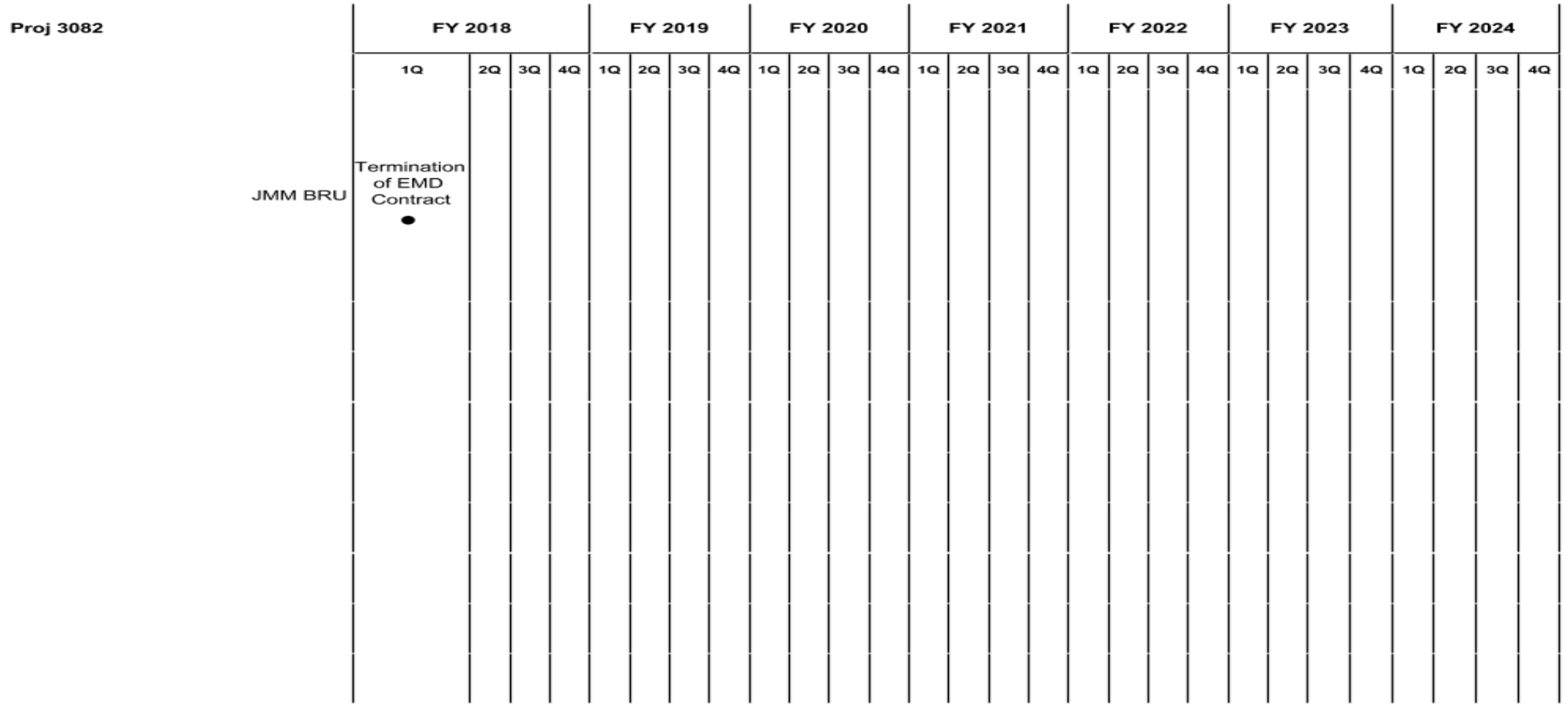
**Remarks**

JMM BRU contract with Raytheon Intelligence Information Systems (RIIS, formerly RTSC) was terminated for convenience 19 October 2017. FY 2018 funding remains for contract termination costs.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 49.353 | 4.553 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 53.906 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3082 / *JMM BRU* |




2020DON - 0604329N - 3082

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604329N / *Small Diameter Bomb (SDB)* | **Project (Number/Name)**<br>3082 / *JMM BRU* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3082*** | | | | |
| JMM BRU: Termination for Convenience | 1 | 2018 | 1 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604366N *I Standard Missile Improvements* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 2,461.493 | 114.802 | 190.881 | 232.391 | - | 232.391 | 241.362 | 174.235 | 56.613 | 27.327 | Continuing | Continuing |
| 0439: *Standard Missile Improvement* | 1,170.827 | 24.270 | 110.058 | 82.533 | - | 82.533 | 68.054 | 46.561 | 15.868 | 10.601 | Continuing | Continuing |
| 2063: *SM-6 Blk IB* | 0.000 | 0.000 | 0.000 | 116.700 | - | 116.700 | 138.700 | 95.500 | 24.300 | 3.700 | Continuing | Continuing |
| 3092: *Standard Missile 6 Program* | 1,290.666 | 90.532 | 55.823 | 33.158 | - | 33.158 | 34.608 | 32.174 | 16.445 | 13.026 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 25.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.000 |

**A. Mission Description and Budget Item Justification**

STANDARD Missile (SM) is Navy's premier Anti-Air Warfare (AAW) missile, providing both area defense for the Fleet and self-defense for individual AEGIS CGs and DDGs, as required by the Joint Theater Air Missile Defense (TAMD), Mission Need Statement (MNS), Defense Planning Guidance (DPG), Quadrennial Defense Review (QDR), and Ship Class AAW Self Defense Capstone Requirements Document. SM-6 provides an air defense force multiplier to the U.S. Navy to greatly expand the AWS battlespace. Combining a modified AMRAAM active seeker onto the proven STANDARD Missile airframe, SM-6 provides an extended range (ER) anti-air warfare capability both over sea and overland. This low-risk approach relying on non-developmental items supported an FY 2011 Initial Operating Capability. With integrated fire control support,
SM-6 BLK I ER provides the Navy with an increased battlespace against Anti-Air Warfare (AAW) threats over-the-horizon.

| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| Previous President's Budget | 158.578 | 165.881 | 93.175 | - | 93.175 |
| Current President's Budget | 114.802 | 190.881 | 232.391 | - | 232.391 |
| Total Adjustments | -43.776 | 25.000 | 139.216 | - | 139.216 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 25.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -2.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -3.576 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 141.331 | - | 141.331 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -2.115 | - | -2.115 |
| • Congressional Directed Reductions Adjustments | -38.200 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604366N *I Standard Missile Improvements* |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *SM-6 Electronics Unit* | 0.000 | 25.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 25.000 |
| Congressional Add Totals for all Projects | 0.000 | 25.000 |

**Change Summary Explanation**

Proj 0439:
The FY 2020 funding request was reduced by ($3.0M) to account for the availability of prior year execution balances.

Project 2063:
FY 2020 reflects an increase for SM-6 BLK IB which provides funding for rocket motor prototyping and development and AUR integration and testing ($116.7M).

Project 3092:
FY 2020 reflects an increase for the SM-6 Electronic Unit Obsolescence-Upgrade which provides funding to support development, design, and testing of new EU hardware for SM-6 BLK 1A. The current EU contains obsolete components that are no longer procurable ($34.2M). The FY 2020 funding request was reduced by ($6.569M) to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>0439 / *Standard Missile Improvement* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0439: *Standard Missile Improvement* | 1,170.827 | 24.270 | 110.058 | 82.533 | - | 82.533 | 68.054 | 46.561 | 15.868 | 10.601 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Missile Integration with Air and Missile Defense S-Band Radar (AMDR-S) for DDG 51 Flight III ships, and with other platforms/Combat System baselines, will include requirements review/updates and analysis, verification; technical documentation, design review and working group SME support, missile/radar integration, missile test hardware procurement, risk assessment, safety, test and evaluation planning, analysis, and data collection. Deliverables include interface control documents (ICDs) changes, missile specifications changes, and engineering documents updates to support AEGIS Configuration Baseline (ACB) 20 IPR Process (FY 18-21) Engineering Development Model (EDM) testing (FY 2016-2020); Combat Systems Engineering Development Site (CSEDS) , Moorestown, New Jersey Combat System/ missile integration testing at PMRF/ARDEL Kauai, HI (FY 2018-2020); Waterfront Integration Testing (WIT) FY 2022 and ACB 20 for DDG 51 FLT III Electromagnetic Environmental Effects (E3) and Hazard of Electromagnetic Radiation to Ordnance (HERO) Testing, analysis, and reports.

SM-2 BLK IIIC, formerly STANDARD Missile-2 Improvements, engineering changes funding is for the design, systems engineering, analysis, integration, and test of replacements for obsolete components as well as performance improvements to address emerging threats. Analysis will include evaluation of transition to an active seeker baseline leveraging the investment made with the SM-6 BLK I and ESSM Block II missiles. Initial funding is for the requirements generation, risk reduction/ mitigation, and documentation leading to the commencement of the obsolescence project. Capability improvements: Enhanced stream-raid performance against numerous threats via target resolution and missile/target pairing logic, over-the-horizon capability for increased depth of fire, enhanced capability against electronic attack, improved firepower due to decreased dependence on illuminators, and enhanced fuzing. The program has been designated an Accelerated Acquisition (AA) program by the CNO/ASN RDA on November 14, 2017. The program schedule will be shifted to reflect the change in process. Initial Capability (IC) planned for Q2FY2023.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SM-2 BLK IIIC (formerly Standard Missile-2 Improvement) | 13.221 | 99.177 | 71.910 | 0.000 | 71.910 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Awarded Engineering Manufacturing and Development (EMD) contract. Perform and support WSESRBs. Perform Jet tab assemblies, Hybrid control surface assembly and dorsal fins prototype testing to verify design. Continue Vertical Launch System (VLS) and canister development efforts. Begin VLS software testing. Continue AUR component development and testing, as well as missile software development. Qualify Insensitive | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Munitions (IM) efforts that enhance the safety and reaction of our weapons for a single pulse Electronic Ignition Safety Device (EISD).<br>***FY 2020 Base Plans:***<br>Prepare for and support a Rapid Fielding Decision (RFD). Perform and support WSESRBs. Continue Jet tab assembly, hybrid control surface assembly, and dorsal fin testing to verify design. Continue Vertical Launch System (VLS) and canister development efforts. Continue missile software development and AEGIS integration. Make preparations for Controlled Test Vehicle 1 (CTV-1) flight test at White Sands Missile Range (WSMR).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in FY 2020 is due to the SM-2 BLK IIIC (formerly SM-2 Improvements) program purchasing the majority of test hardware and test equipment in FY2019. In FY2020, development and testing for the program will continue,<br>but most of the items procured in FY2019. The FY2020 funding request was reduced by ($3.000) million to account for the availability of prior year execution balances. | | | | | |
| ***Title:*** Air and Missile Defense Radar (AMDR) Integration & Test | 11.049 | 10.881 | 10.623 | 0.000 | 10.623 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue conducting E3/HERO analysis and qualification testing. Conduct E3 test using inert operational missile with SPY-6 engineering development model array. Continue to develop, integrate, test and implement ET-17 solutions to address missile/CS interface. Prepare for and support ACB 20 IPR process and continue to address missile/ET-17 related actions. Continue to attend and support missile FLT III Ordnance EMI/HERO issue mitigation test and analysis.<br>***FY 2020 Base Plans:***<br>Plan and support missile radar and combat system (CS) testing using IOM/VOM with AEGIS combat system using SPY-6 at SCSC, Surface Combat System Center Wallops Island. Continue to integrate and implement ET-17 solutions HERO Issue testing as required. Support ACB 20 IPR Process.<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY 2020 decrease is due to control cost by the missile test program in FY 2020 by aligning with the Combat System Test Program. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 24.270 | 110.058 | 82.533 | 0.000 | 82.533 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Engineering and integration testing for SM-2 BLK IIIC (formerly SM-2 Improvements) in FY 2017-FY 2023 to support Developmental Test in FY 2021 and continue follow-on ship integration and design update effort in FY 2022.

**E. Performance Metrics**

Perform E3/HERO design, analyses, and E3/HERO qualification tests for AMDR in FY 2017-2019.

AMDR MCTS/MSU Uplink/Downlink testing is planned for FY 2017/2019.

AMDR IOM, MSU, or VOM testing is planned for FY2019-2021.

Combat System Integration for AMDR is planned for FY2020-2021

Waterfront Integration Testing for AMDR is planned for FY2021/2022.

AMDR ET-17 MSLEX 4Q2023

SM-2 BLK IIIC (SM-2 Improvements) Preliminary Design IPR in FY2019.

SM-2 BLK IIIC (SM-2 Improvements) Software systems Safety Technical Review Panel (SSSTRP) in FY2018.

SM-2 BLK IIIC (SM-2 Improvements) Weapons System Explosive Safety Review Board (WSESRB) in FY2019.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |

SM-2 BLK IIIC (SM-2 Improvements) Developmental Test in FY2022.

SM-2 BLK IIIC (SM-2 Improvements) Obtain Initial Capability approval in FY 2023.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>0439 / *Standard Missile Improvement* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design and Analysis1 | C/CPFF | RAYTHEON : Tucson, AZ | 305.509 | 13.103 | Nov 2017 | 75.162 | Nov 2018 | 50.286 | Nov 2019 | - | | 50.286 | Continuing | Continuing | Continuing |
| Design and Analysis2 | C/CPFF | JHU/APL : Laurel, MD | 11.906 | 3.955 | Nov 2017 | 6.308 | Nov 2018 | 5.700 | Nov 2019 | - | | 5.700 | 0.000 | 27.869 | - |
| Design and Analysis3 | MIPR | MIT/Lin Lab : Lexington, MA | 0.050 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Design and Analysis4 | WR | NSWC : Dahlgren | 789.605 | 1.212 | Nov 2017 | 1.125 | Nov 2018 | 0.280 | Nov 2019 | - | | 0.280 | 0.000 | 792.222 | - |
| Design and Analysis5 | WR | NSWC : Indian Head | 0.940 | 0.000 | | 0.059 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.999 | - |
| Design and Analysis6 | WR | NAWC : China Lake | 5.029 | 0.600 | Nov 2017 | 0.315 | Nov 2018 | 0.165 | Nov 2019 | - | | 0.165 | 0.000 | 6.109 | - |
| Design and Analysis7 | Various | LOCKHEED MARTIN : Moorestown, NJ | 17.775 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.775 | - |
| Design and Analysis8 | WR | CNO : Washington, DC | 0.010 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.010 | - |
| Design and Analysis9 | WR | CMDP : Phoenix, AZ | 4.795 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.795 | - |
| Design and Analysis11 | WR | NSWC : Crane | 0.257 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.257 | - |
| Design and Analysis12 | WR | DOI&CNAP : Washington, DC | 0.487 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.487 | - |
| Design and Analysis13 | WR | COMPTEVFOR : Norfolk, VA | 0.200 | 0.100 | Nov 2017 | 0.160 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.460 | - |
| Design and Analysis14 | C/CPFF | LOCKHEED MARTIN : Moorestown, NJ | 2.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.000 | - |
| Design and Analysis15 | WR | CARDEROCK : Bethesda, MD | 0.050 | 0.000 | | 0.030 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.080 | - |
| Design and Analysis16 | WR | NWAS : Corona | 0.936 | 0.500 | Nov 2017 | 0.125 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.561 | - |
| Design and Analysis17 | C/CPFF | CORVID : Mooresville, NC | 0.100 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Design and Analysis18 | C/CPFF | BAE : Rockville, MD | 0.172 | 0.000 | | 0.140 | Jan 2019 | 0.160 | Nov 2019 | - | | 0.160 | 0.000 | 0.472 | - |
| Design and Analysis19 | MIPR | MDA : Dahlgren,VA | 1.257 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.257 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>0439 / *Standard Missile Improvement* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design and Analysis20 | WR | IWS3D : ARLINGTON, VA | 1.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.500 | - |
| Design and Analysis21 | WR | VARIOUS : IWS (IWS 1) | 17.281 | 1.010 | Nov 2017 | 14.447 | Nov 2018 | 12.608 | Nov 2019 | - | | 12.608 | 0.000 | 45.346 | - |
| Design and Analysis22 | WR | IWS3L : Arlington, Va | 0.000 | 2.250 | Nov 2017 | 8.600 | Nov 2018 | 4.375 | Nov 2019 | - | | 4.375 | 0.000 | 15.225 | - |
| Design and Analysis23 | WR | NSWC : PHD | 0.000 | 0.684 | Nov 2017 | 0.075 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.759 | - |
| | | **Subtotal** | 1,159.859 | 23.414 | | 106.546 | | 73.574 | | - | | 73.574 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEVELOPMENTAL TEST & EVALUATION1 | WR | NSWC : Port Hueneme | 0.185 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.185 | - |
| DEVELOPMENTAL TEST & EVALUATION2 | WR | WSMR : New Mexico | 1.600 | 0.000 | | 0.030 | Nov 2018 | 1.000 | Nov 2019 | - | | 1.000 | 0.000 | 2.630 | - |
| DEVELOPMENTAL TEST & EVALUATION3 | WR | NAWC : Pt Mugu | 0.098 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.098 | - |
| DEVELOPMENTAL TEST & EVALUATION4 | WR | PMRF : Hawaii | 0.338 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.338 | - |
| DEVELOPMENTAL TEST & EVALUATION5 | WR | NSWC : PHD/ Techrep | 0.567 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.567 | - |
| DEVELOPMENTAL TEST & EVALUATION6 | SS/CPFF | RAYTHEON : Tucson, Az | 0.000 | 0.000 | | 0.000 | | 1.695 | Nov 2019 | - | | 1.695 | 0.000 | 1.695 | - |
| DEVELOPMENTAL TEST & EVALUATION7 | C/CPFF | JHU/APL : Laurel, Md | 0.000 | 0.000 | | 0.000 | | 0.519 | Nov 2019 | - | | 0.519 | 0.000 | 0.519 | - |
| DEVELOPMENTAL TEST & EVALUATION7 | C/CPIF | VARIOUS : IWS (IWS 1) | 0.000 | 0.000 | | 0.000 | | 2.372 | Nov 2019 | - | | 2.372 | 0.000 | 2.372 | - |
| DEVELOPMENTAL TEST & EVALUATION7 | WR | NSWC : Dahlgren | 0.000 | 0.000 | | 0.000 | | 0.248 | Nov 2019 | - | | 0.248 | 0.000 | 0.248 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>0439 / *Standard Missile Improvement* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 2.788 | 0.000 | | 0.030 | | 5.834 | | - | | 5.834 | 0.000 | 8.652 | N/A |

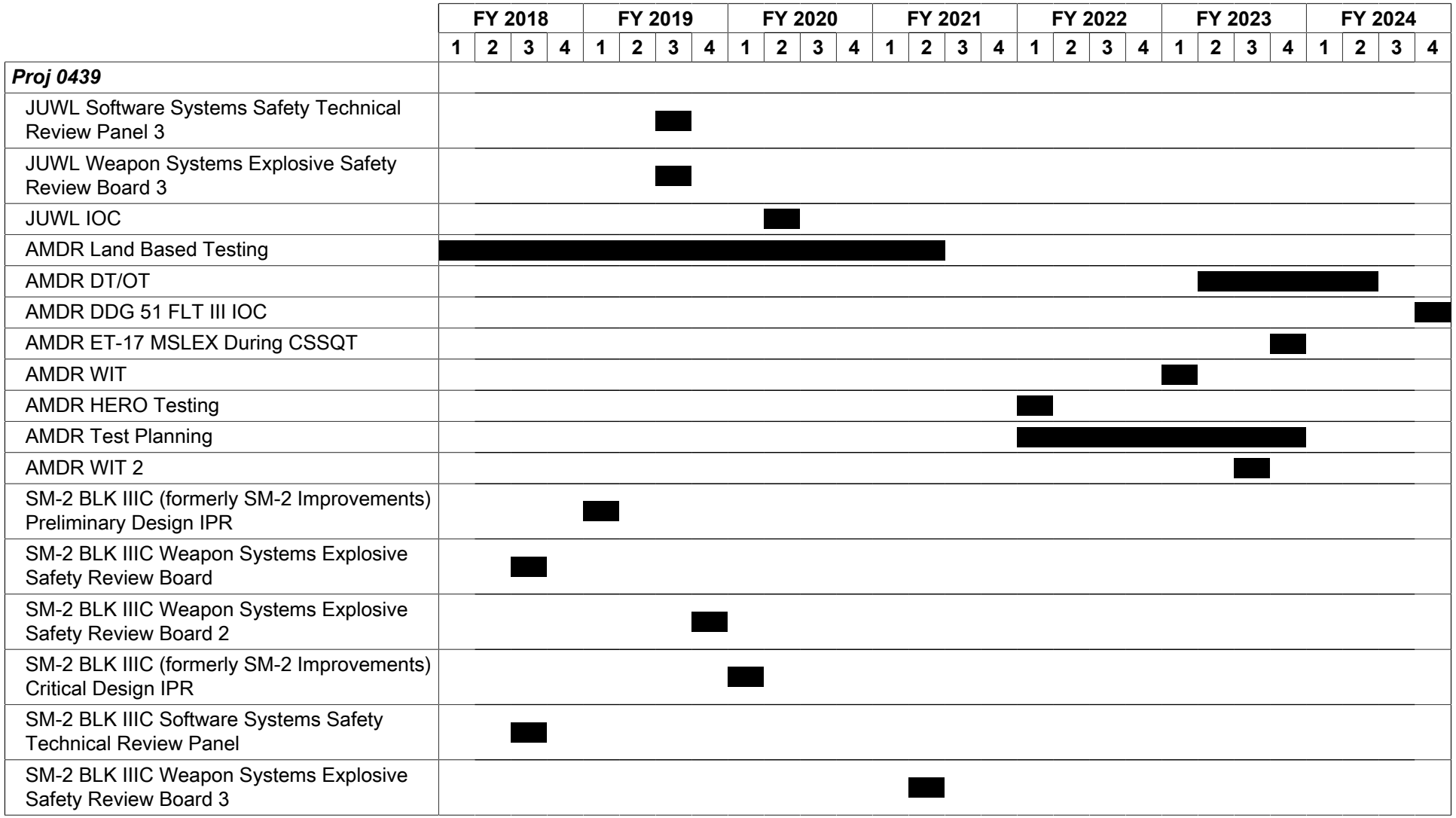
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTRACTOR ENGINEERING SUPPORT | C/CPAF | VARIOUS : VARIOUS | 2.630 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.630 | - |
| PROGRAM MANAGEMENT SUPPORT | C/CPAF | VARIOUS : VARIOUS | 5.214 | 0.796 | Nov 2017 | 3.402 | Nov 2018 | 3.105 | Nov 2019 | - | | 3.105 | 0.000 | 12.517 | - |
| TRAVEL | Allot | IWS3 : Arlington, VA | 0.336 | 0.060 | Nov 2017 | 0.080 | Nov 2018 | 0.020 | Nov 2019 | - | | 0.020 | 0.000 | 0.496 | - |
| | | **Subtotal** | 8.180 | 0.856 | | 3.482 | | 3.125 | | - | | 3.125 | 0.000 | 15.643 | N/A |

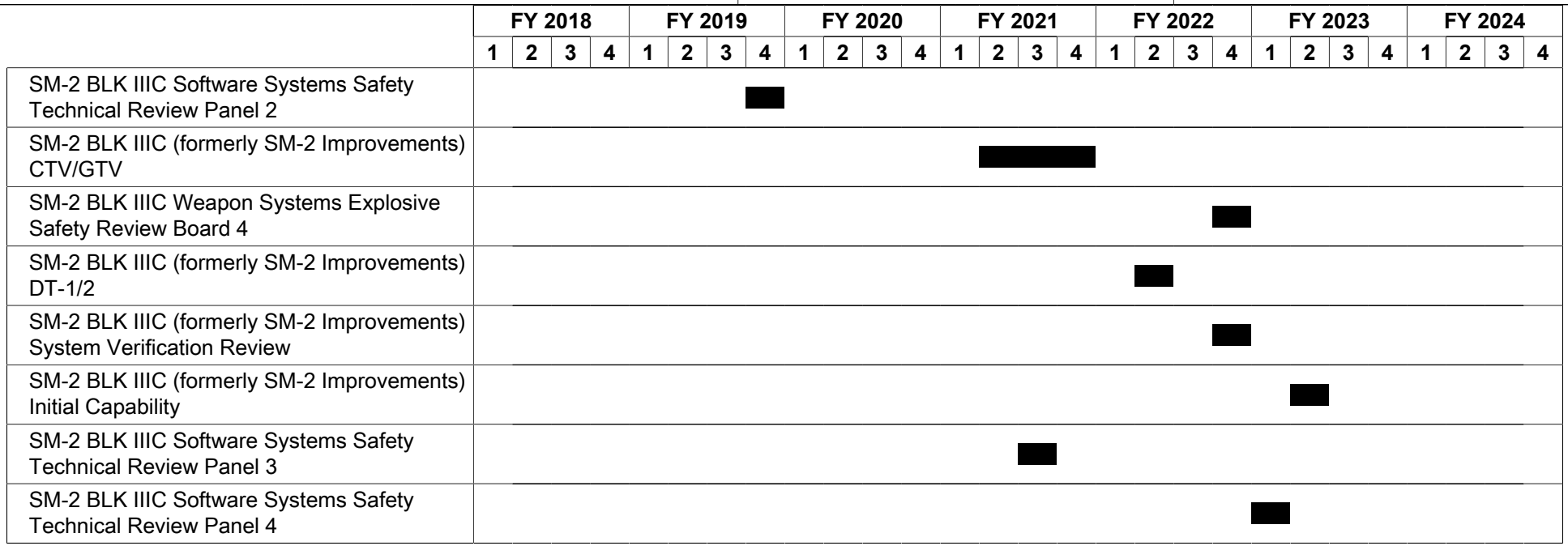
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,170.827 | 24.270 | | 110.058 | | 82.533 | | - | | 82.533 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0439*** | | | | |
| JUWL Software Systems Safety Technical Review Panel 3 | 3 | 2019 | 3 | 2019 |
| JUWL Weapon Systems Explosive Safety Review Board 3 | 3 | 2019 | 3 | 2019 |
| JUWL IOC | 2 | 2020 | 2 | 2020 |
| AMDR Land Based Testing | 1 | 2018 | 2 | 2021 |
| AMDR DT/OT | 2 | 2023 | 2 | 2024 |
| AMDR DDG 51 FLT III IOC | 4 | 2024 | 4 | 2024 |
| AMDR ET-17 MSLEX During CSSQT | 4 | 2023 | 4 | 2023 |
| AMDR WIT | 1 | 2023 | 1 | 2023 |
| AMDR HERO Testing | 1 | 2022 | 1 | 2022 |
| AMDR Test Planning | 1 | 2022 | 4 | 2023 |
| AMDR WIT 2 | 3 | 2023 | 3 | 2023 |
| SM-2 BLK IIIC (formerly SM-2 Improvements) Preliminary Design IPR | 1 | 2019 | 1 | 2019 |
| SM-2 BLK IIIC Weapon Systems Explosive Safety Review Board | 3 | 2018 | 3 | 2018 |
| SM-2 BLK IIIC Weapon Systems Explosive Safety Review Board 2 | 4 | 2019 | 4 | 2019 |
| SM-2 BLK IIIC (formerly SM-2 Improvements) Critical Design IPR | 1 | 2020 | 1 | 2020 |
| SM-2 BLK IIIC Software Systems Safety Technical Review Panel | 3 | 2018 | 3 | 2018 |
| SM-2 BLK IIIC Weapon Systems Explosive Safety Review Board 3 | 2 | 2021 | 2 | 2021 |
| SM-2 BLK IIIC Software Systems Safety Technical Review Panel 2 | 4 | 2019 | 4 | 2019 |
| SM-2 BLK IIIC (formerly SM-2 Improvements) CTV/GTV | 2 | 2021 | 4 | 2021 |
| SM-2 BLK IIIC Weapon Systems Explosive Safety Review Board 4 | 4 | 2022 | 4 | 2022 |
| SM-2 BLK IIIC (formerly SM-2 Improvements) DT-1/2 | 2 | 2022 | 2 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>0439 / *Standard Missile Improvement* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SM-2 BLK IIIC (formerly SM-2 Improvements) System Verification Review | 4 | 2022 | 4 | 2022 |
| SM-2 BLK IIIC (formerly SM-2 Improvements) Initial Capability | 2 | 2023 | 2 | 2023 |
| SM-2 BLK IIIC Software Systems Safety Technical Review Panel 3 | 3 | 2021 | 3 | 2021 |
| SM-2 BLK IIIC Software Systems Safety Technical Review Panel 4 | 1 | 2023 | 1 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>2063 / *SM-6 Blk IB* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2063: *SM-6 Blk IB* | 0.000 | 0.000 | 0.000 | 116.700 | - | 116.700 | 138.700 | 95.500 | 24.300 | 3.700 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program leverages existing missile technology and advanced missile technology from the Phase 1A RPED rocket motor effort completing in FY 19. It aligns with the STANDARD Missile roadmap and takes advantage of the Navy's investment in the AEGIS Weapon System (AWS). This missile will provide an extended range capability for SM-6 and will be a key contributor to the protection of Joint U.S. Forces, in support of the 2018 National Defense Strategy. SM-6 Block IB addresses valid Joint, Fleet, and Navy Urgent Operational Needs and existing, JROC-approved requirements.

The Accelerated Acquisition Board of Directors (AA BoD) met on 17 January 2018 and approved the designation of the SM-6 Block IB Phase IA as a Rapid Prototyping, Experimentation and Demonstration (RPED) project. This designation acknowledged the requirement to expedite the development, acquisition and fielding of the SM-6 Block IB to Naval Forces. The AA BoD met 9 November 2018 and directed SM-6 BLKIB to commence All Up Round prototyping (Phase IB).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SM-6 BLK IB | 0.000 | 0.000 | 116.700 | 0.000 | 116.700 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>RDTEN funding for 21-inch rocket motor will inform Engineering and Manufacturing Development (EMD) for a fully qualified system. Design, fabricate, test and qualification of multiple 21-inch diameter rocket motor prototypes. Fund design study contracts for a new 21-inch rocket motor and missile steering control section. Conduct technical, schedule, and cost analyses for the integration of a new 21-inch rocket motor, a new steering control section (SCS), and modified control surface areas (CSA) to be integrated with existing components of the SM-6 Block IA missile. Develop preliminary design of a modified Power Conditioning & Telemetry (PC&T) transition section and conduct associated design trade studies. Conduct thermal analyses for all non-developmental components, and design and develop a new All-Up-Round (AUR) Thermal Protection System (TPS). Identify and implement design modifications to the Vertical Launch System (VLS) Mk 29 canister. Plan and execute combat systems integration and testing. Update all associated design and interface specifications as necessary. Update the tactical simulation, guidance navigation and control, autopilot algorithms and digital | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>2063 / *SM-6 Blk IB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| signal processing for the SM-6 Block IB AUR. Coordinate efforts with the NAVSEA/NOSSA to obtain required qualifications and system safety certifications.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 20 increase is for SM-6 BLK IB program which provides funding for rocket motor prototyping and development and AUR integration and testing. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 116.700 | 0.000 | 116.700 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

SM-6 Block IB Acquisition Strategy in development.

**E. Performance Metrics**

Upcoming milestones:
- CDR FY20
- SM-6 BLK IB LRIP FY21
- Control Test Vehicle events (CTV) (2) 2QFY21, 4QFY21
- Guided Test Vehicle events (GTV) (2) 2QFY22, 4QFY22
- Developmental Test and Evaluation (DT&E) event (1) 1QFY23
- DT&E/Operational Test and Evaluation (OT&E)(DT/OT) event (1) 2QFY23
- Initial Capability (IC) FY23

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>2063 / *SM-6 Blk IB* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design and Analysis | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 0.000 | | 9.336 | Nov 2019 | - | | 9.336 | Continuing | Continuing | Continuing |
| Design and Analysis | WR | NAWC WD : China Lake | 0.000 | 0.000 | | 0.000 | | 9.336 | Nov 2019 | - | | 9.336 | Continuing | Continuing | Continuing |
| Design and Analysis | WR | NSWC : Indian Head | 0.000 | 0.000 | | 0.000 | | 4.668 | Nov 2019 | - | | 4.668 | Continuing | Continuing | Continuing |
| Design and Analysis | C/CPFF | Raytheon : Tucson, AZ | 0.000 | 0.000 | | 0.000 | | 48.314 | Nov 2019 | - | | 48.314 | Continuing | Continuing | Continuing |
| Design and Analysis | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 29.875 | Nov 2019 | - | | 29.875 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 101.529 | | - | | 101.529 | Continuing | Continuing | N/A |

**Remarks**

Line 6 is an open competition for the Rocket Motor, Steering Control System and the Control Surface Assembly.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test and Evaluation | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 0.000 | | 1.167 | Nov 2019 | - | | 1.167 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | WR | NAWC WD : China Lake | 0.000 | 0.000 | | 0.000 | | 1.167 | Nov 2019 | - | | 1.167 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | WR | NSWC : Port Hueneme | 0.000 | 0.000 | | 0.000 | | 3.501 | Nov 2019 | - | | 3.501 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | C/CPFF | Raytheon : Tucson, AZ | 0.000 | 0.000 | | 0.000 | | 5.835 | Nov 2019 | - | | 5.835 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 11.670 | | - | | 11.670 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>2063 / *SM-6 Blk IB* |

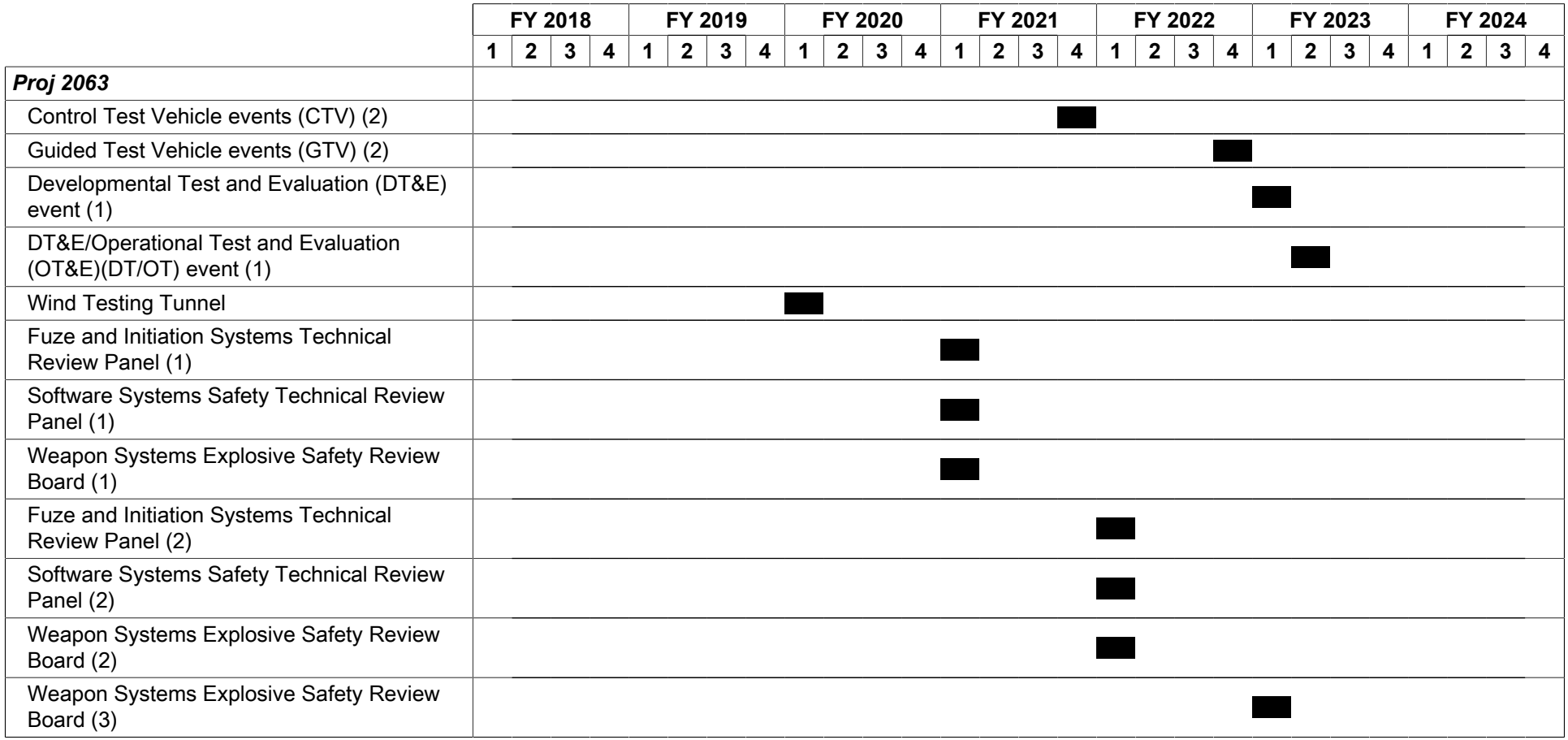
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | VARIOUS : VARIOUS | 0.000 | 0.000 | | 0.000 | | 3.501 | Nov 2019 | - | | 3.501 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 3.501 | | - | | 3.501 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 116.700 | | - | | 116.700 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>2063 / *SM-6 Blk IB* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>2063 / *SM-6 Blk IB* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2063*** | | | | |
| Control Test Vehicle events (CTV) (2) | 4 | 2021 | 4 | 2021 |
| Guided Test Vehicle events (GTV) (2) | 4 | 2022 | 4 | 2022 |
| Developmental Test and Evaluation (DT&E) event (1) | 1 | 2023 | 1 | 2023 |
| DT&E/Operational Test and Evaluation (OT&E)(DT/OT) event (1) | 2 | 2023 | 2 | 2023 |
| Wind Testing Tunnel | 1 | 2020 | 1 | 2020 |
| Fuze and Initiation Systems Technical Review Panel (1) | 1 | 2021 | 1 | 2021 |
| Software Systems Safety Technical Review Panel (1) | 1 | 2021 | 1 | 2021 |
| Weapon Systems Explosive Safety Review Board (1) | 1 | 2021 | 1 | 2021 |
| Fuze and Initiation Systems Technical Review Panel (2) | 1 | 2022 | 1 | 2022 |
| Software Systems Safety Technical Review Panel (2) | 1 | 2022 | 1 | 2022 |
| Weapon Systems Explosive Safety Review Board (2) | 1 | 2022 | 1 | 2022 |
| Weapon Systems Explosive Safety Review Board (3) | 1 | 2023 | 1 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | | | | Project (Number/Name)<br>3092 / *Standard Missile 6 Program* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3092: *Standard Missile 6 Program* | 1,290.666 | 90.532 | 55.823 | 33.158 | - | 33.158 | 34.608 | 32.174 | 16.445 | 13.026 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program leverages existing missile technology and advanced missile technology. It aligns missile technology roadmaps across the services (NAVSEA, NAVAIR, USAF, USMC and USA) and missile variants within the services, taking advantage of the Navy's investment in the AEGIS Weapons System (AWS), Cooperative Engagement Capability (CEC), and airborne early warning systems. This missile will provide an extended range engagement capability to provide the air superiority and the umbrella of protection for joint U.S. forces and allies against the full spectrum of manned-fixed and rotary-wing aircraft, unmanned aerial vehicles, and land attack and anti-ship cruise missiles in flight. This missile contributes to the continuous protection of forward deployed ground maneuver forces as well as theater rear assets supporting mission requirements discussed in the National Security Strategy (NSS), Secretary of Defense National Defense Strategy (NDS), Chairman of the Joint Chiefs' National Military Strategy (NMS), Capstone Concept for Joint Operations (CCJO), Joint Requirements Oversight Council (JROC) Integrated Air and Missile Defense (IAMD) Initial Capability Document (ICD), the JROC IAMD Joint Integrating Concept (JIC), JROC IAMD Operational Concept; the Theater and Air Missile Defense ICD (TAMD MDA-ICD), the Chairman of the Joint Chiefs of Staff Joint IAMD Vision 2020/2030 and the Joint Publication 3-01 Countering Air and Missile Threats; the Navy's Integrated Fire Control Naval Integrating Capability Concept (NIFC-NICC), the JROC Operational Requirements Document (ORD) for SM-6 BLK 1, and the JROC SM-6 Capability Production Document.

SM-6 portion of Joint and Naval Integrated Fire Control (IFC) is to support the integration, land-based and at-sea test, and analysis in support of the NIFC-CA test and evaluation strategy. NIFC-CA Increment 1 was successfully executed between 2009 and 2015. NIFC-CA Increment 2 commenced in FY 16 and will be tested in FY19 and FY20. It integrates sensor improvements, SM-6 BLK IA, CEC and AWS ACB 16 into an advanced from the sea (FTS) Kill chain. Efforts include support for the WSMR upgrade, Trackex events, Integration Events and Live Fire test at land based and at-sea tests.

Future Capabilities Demonstration project supports systems engineering, SM demonstrations, captive flight tests, data collection, and analysis tasks to develop and demonstrate new capabilities for the SM-6 Missile. These capabilities directly support high priority mission requirements requested by Combatant Commanders. Additional details are held at a higher classification.

SM-6 System Engineering and Flight Test supports the development of the next guidance section software configuration. This includes the research, development, test and evaluation necessary to incorporate the software in production missiles.

STANDARD Missile 6 Electronics Unit funding is for the design, systems engineering, analysis, integration, and test of replacements for obsolete components. Funding will be combined with Missile Defense Agency funding for a shared approach to obsolescence and improved capability in defense of the sea base. Initial funding is for the requirements generation, risk reduction/mitigation, and establishment of development facilities necessary for the commencement of the obsolescence project.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |

Capability improvements are limited to those required by Missile Defense Agency. The Missile Defense Agency is the contracting office and expect a RFP issued in Q4FY18 with contract award in Q2FY19.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Electronics Unit (EU) Obsolescence-Upgrade | 0.000 | 0.000 | 26.905 | 0.000 | 26.905 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Conduct a system level PDR and then design, integrate and begin qualification on hardware. Develop tactical software and simulations. Begin planning and execution of captive flight test campaign to characterize performance and refine missile tactical software and simulation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY 20 increase is for SM-6 Electronic Unit (EU) Obsolescence-Upgrade program iniation which provides funding to support development, design, and testing of new EU hardware for SM-6 BLK 1A. The current EU contains obsolete components that are no longer procurable. The FY2020 funding request was reduced ($6.569M) to account for the availability of prior year execution balances. | | | | | |
| ***Title:*** SM-6 System Engineering and Flight Test Support | 6.018 | 5.500 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Prepare SM-6 BLKI software engineering change proposal for review and approval. Conduct follow on regression test. Perform a flight test, for the collection of data, performance and analysis, and reliability assessments.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The decrease in FY 2020 corresponds to completion of software development activities and transition to production. | | | | | |
| ***Title:*** Naval Integrated Fire Control - Counter Air (NIFC-CA) | 6.018 | 2.988 | 3.213 | 0.000 | 3.213 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue supporting Increment 2 System of System (SoS) integration and test activities associated with the White Sands Missile Range (WSMR) Desert Ship Upgrade. Support test event LFT (6) and At-Sea (6). | | | | | |
| ***FY 2020 Base Plans:***<br>Continue supporting Increment 2 System of System (SoS) integration and test activities associated with the White Sands Missile Range (WSMR) Desert Ship Upgrade. Commence work for SM-6 BLK I and IA NIFC-CA related software upgrades. Support test event LFT (7) and At-Sea (7). | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase is due to supporting two test flight events in FY 2020 with higher rates. | | | | | |
| ***Title:*** Future Capability Demonstration | 78.496 | 47.335 | 3.040 | 0.000 | 3.040 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue development of additional capabilities in SM-6 Blk IA missile. Complete preparations for and conduct Future Capability Demonstration At-Sea Test 3 (two CTVs and one TACDEMO flight), which was delayed from 3QFY18 due to test ship non-availability, in 3QFY19. Complete preparation for and support Future Capability Demonstration Land-Based Test 1 (two TACDEMO flights) in 3Q/4QFY19. Complete all preparations for Future Capability Demonstration At-Sea Test 4 (one TACDEMO flight) in 1QFY20. Conduct captive flight tests (CFTs) for collection of data, performance analysis, and reliability assessments. Complete missile and AEGIS combat system software development and conduct necessary software alignment with other SM-6 capabilities. Additional details are held at a higher classification. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Conduct Future Capability Demonstration At-Sea Test 4 (one TACDEMO flight) in 1QFY20. Complete post-test analysis. Generate objective quality evidence (OQE) to support a software Engineering Change Proposal (ECP) to cut the new capabilities into the SM-6 Blk IA production line.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The reduction is due to effort transitioning to production. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 90.532 | 55.823 | 33.158 | 0.000 | 33.158 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN 2234: *Standard Missile* | 491.260 | 615.893 | 500.608 | - | 500.608 | 593.909 | 634.894 | 581.302 | 902.917 | 2,579.554 | 9,711.486 |
| • Standard Missile: *QTY* | 125.000 | 125.000 | 125.000 | - | 125.000 | 125.000 | 125.000 | 125.000 | 0.000 | 386.000 | 1,800.000 |

**Remarks**

WPN 2234 includes SM-6 BLK IB, WIB MAT Project I issue and SM-6 BLK I/IA multiyear procurement. Quantities only reflect SM-6 BLK I/IA. PDOCS Check is not reflective of the WPN 2234 controls.

**D. Acquisition Strategy**

SM-6 Acquisition Strategy signed by OSD AT&L 14 March 2012.

**E. Performance Metrics**

Accomplishments
- Future Capability Demonstration Captive Flight Test 2nd quarter 2015 - 1st quarter 2016
- Future Capability Demonstration Captive Test Vehicle events Feb 2015
- DT (FOT&E) 2015
- Future Capability Demonstration At-Sea Test (2) Jan 2016
- NIFC-CA At-Sea Test (3) Sep 2016
- NIFC-CA Live Fire Test (4) (Joint Strike Fighter Demo) Sep 2016
- OT (FOT&E) Jan 2016
- Future Capability Demonstration Captive Flight Test (CFT) (3) Mar 2017
- NIFC-CA Live Fire Test (5) May 2017

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |

- Operational Test (OT-5/15) Apr 2017
- Full Operational Capability (FOC) Dec 2017
- NIFC-CA At-Sea Test (4) July 2018
- Future Capability Demonstration Guided Test Vehicle 4 (GTV-4) Test September FY 18

Upcoming Milestones
- Integrated Fire Control (IFC) Increments I (Oct 2008-Sep 2015) and II (Oct 2015-Sep 2022)
- Future Capability Demonstration At-Sea Test (3) 3Q FY 19
- Future Capability Demonstration Land-Based Test (1) 3Q/4Q FY 19
- Future Capability Demonstration At-Sea Test (4) 1Q FY 20
- Future Capability Demonstration Captive Flight Test (CFT) (4) 1Q-2Q FY 18
- Future Capability Demonstration Captive Flight Test (CFT) (5) 3Q FY 18 - 1Q FY 19

- NIFC-CA Live Fire Test (6) 2Q FY 19
- NIFC-CA At-Sea Test (6) 4Q FY 19
- NIFC-CA At-Sea Test (7) 1Q FY 20
- NIFC-CA Live Fire Test (7) 3Q FY 20
- System Requirements Review in Q2FY19
- Electronics Unit System Preliminary Design Review in Q2FY20
- Electronics Unit Software and Hardware Critical Design Review Q4FY20
- Electronics Unit System Critical Design Review Q2FY21
- Electronics Unit Guided Test Vehicle-1 at White Sands Missile Range Q3FY22
- Electronics Unit At Sea Testing Q2FY23
- Electronics Unit Engineering Change Proposal for production Q2FY24

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>3092 / *Standard Missile 6 Program* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design & Analysis | C/CPFF | RAYTHEON : Tucson, AZ | 762.668 | 23.119 | Nov 2017 | 17.352 | Nov 2018 | 22.502 | Nov 2019 | - | | 22.502 | Continuing | Continuing | Continuing |
| Design & Analysis | C/CPFF | JHU/APL : Laurel MD | 60.169 | 6.978 | Nov 2017 | 5.144 | Nov 2018 | 3.716 | Nov 2019 | - | | 3.716 | 0.000 | 76.007 | - |
| Design & Analysis | MIPR | MIT/Lin Lab : Lexington, MA | 0.550 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.550 | - |
| Design & Analysis | WR | NAWC : China Lake | 5.768 | 7.376 | Nov 2017 | 0.480 | Nov 2018 | 0.400 | Nov 2019 | - | | 0.400 | 0.000 | 14.024 | - |
| Design & Analysis | WR | NSWC : Dahlgren | 11.949 | 0.959 | Nov 2017 | 0.000 | | 0.400 | Nov 2019 | - | | 0.400 | 0.000 | 13.308 | - |
| Design & Analysis | WR | NSWC : Indian Head | 3.942 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.942 | - |
| Design & Analysis | WR | NSWC : PHD | 11.067 | 1.560 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.627 | - |
| Design & Analysis | WR | NSWC : Crane | 1.256 | 0.000 | | 0.000 | | 0.100 | Nov 2019 | - | | 0.100 | 0.000 | 1.356 | - |
| Design & Analysis | MIPR | JSPO : Eglin AFB | 24.049 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.049 | - |
| Design & Analysis | C/CPFF | LOCKHEED Martin : Moorestown, NJ | 6.074 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.074 | - |
| Design & Analysis | WR | NSWC : Corona | 20.664 | 3.536 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.200 | - |
| Design & Analysis | Reqn | ONR : Arlington, VA | 5.320 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.320 | - |
| Design & Analysis | Reqn | NRL : Washington, DC | 0.140 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.140 | - |
| Design & Analysis | WR | COMPTEVFOR : Norfolk, VA | 2.620 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.620 | - |
| Design & Analysis | WR | CARDEROCK : Philadelphia, PA | 3.858 | 0.200 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.058 | - |
| Design & Analysis | WR | NSWC : Pt Mugu | 0.613 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.613 | - |
| Design & Analysis | C/CPFF | BAE : Rockville, MD | 6.486 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.486 | - |
| Design & Analysis | MIPR | ARMY : Redstone | 0.350 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.350 | - |
| Design & Analysis | WR | NAWCAD : Pax River, MD | 3.712 | 0.050 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.762 | - |
| Design & Analysis | C/CPFF | CORVID : Mooresville, NC | 10.100 | 3.200 | Nov 2017 | 1.670 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 14.970 | - |
| Design & Analysis | C/CPFF | RNB : Arlington, VA | 0.010 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.010 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>3092 / *Standard Missile 6 Program* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design & Analysis | WR | SPAWAR : Arlington, VA | 0.007 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.007 | - |
| Design & Analysis | WR | ARMY : Cecom | 0.066 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.066 | - |
| Design & Analysis | C/FP | GENERAL DYNAMICS : Falls Church, VA | 1.660 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.660 | - |
| Design & Analysis | WR | VARIOUS : (IWS 1A) | 104.982 | 17.275 | Nov 2017 | 9.455 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 131.712 | - |
| Design & Analysis | WR | VARIOUS : (VLS) | 25.674 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.674 | - |
| Design & Analysis | WR | NSWC : WSMR | 0.200 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| Design & Analysis | WR | PMRF : Hawaii | 3.106 | 0.700 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.806 | - |
| Design & Analysis | WR | DOI : Washington D.C. | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 1,077.060 | 64.953 | | 34.101 | | 27.118 | | - | | 27.118 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NSWC : Port Hueneme | 6.429 | 1.700 | Nov 2017 | 1.245 | Nov 2018 | 0.060 | Nov 2019 | - | | 0.060 | 0.000 | 9.434 | - |
| Developmental Test & Evaluation | WR | NSWC : WSMR | 27.292 | 2.733 | Nov 2017 | 3.175 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 33.200 | - |
| Developmental Test & Evaluation | WR | PMRF : Hawaii | 42.301 | 2.300 | Nov 2017 | 3.000 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 47.601 | - |
| Developmental Test & Evaluation | WR | NAWC : Pt Mugu | 4.191 | 1.000 | Nov 2017 | 0.875 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 6.066 | - |
| Developmental Test & Evaluation | C/CPAF | RAYTHEON : Tucson, AZ | 42.917 | 6.500 | Nov 2017 | 3.200 | Nov 2018 | 0.800 | Nov 2019 | - | | 0.800 | 0.000 | 53.417 | - |
| Developmental Test & Evaluation | C/CPFF | JHU/APL : Laurel, MD | 17.063 | 0.941 | Nov 2017 | 1.800 | Nov 2018 | 0.980 | Nov 2019 | - | | 0.980 | 0.000 | 20.784 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>3092 / *Standard Missile 6 Program* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NSWC : Corona | 12.976 | 0.600 | Nov 2017 | 2.750 | Nov 2018 | 1.250 | Nov 2019 | - | | 1.250 | 0.000 | 17.576 | - |
| Developmental Test & Evaluation | WR | NSWC : Dahlgren | 2.466 | 0.300 | Nov 2017 | 0.620 | Nov 2018 | 0.850 | Nov 2019 | - | | 0.850 | 0.000 | 4.236 | - |
| Developmental Test & Evaluation | WR | VLS : Arlington, VA | 2.369 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.369 | - |
| Developmental Test & Evaluation | WR | COMPTEVFOR : Norfolk, Va | 1.664 | 0.225 | Nov 2017 | 0.230 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.119 | - |
| Developmental Test & Evaluation | WR | VARIOUS : (IWS 1A) | 3.782 | 0.500 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.282 | - |
| Developmental Test & Evaluation | WR | NSWC : Carderock | 2.280 | 0.100 | Nov 2017 | 0.200 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.580 | - |
| Developmental Test & Evaluation | WR | NAWC : China Lake | 5.118 | 4.500 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.618 | - |
| Developmental Test & Evaluation | WR | ONR : Arlington, Va | 3.425 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.425 | - |
| Developmental Test & Evaluation | WR | DOI : Washington D.C. | 0.545 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.545 | - |
| | | **Subtotal** | 174.818 | 21.399 | | 17.095 | | 3.940 | | - | | 3.940 | 0.000 | 217.252 | N/A |

**Management Services ($ in Millions)**

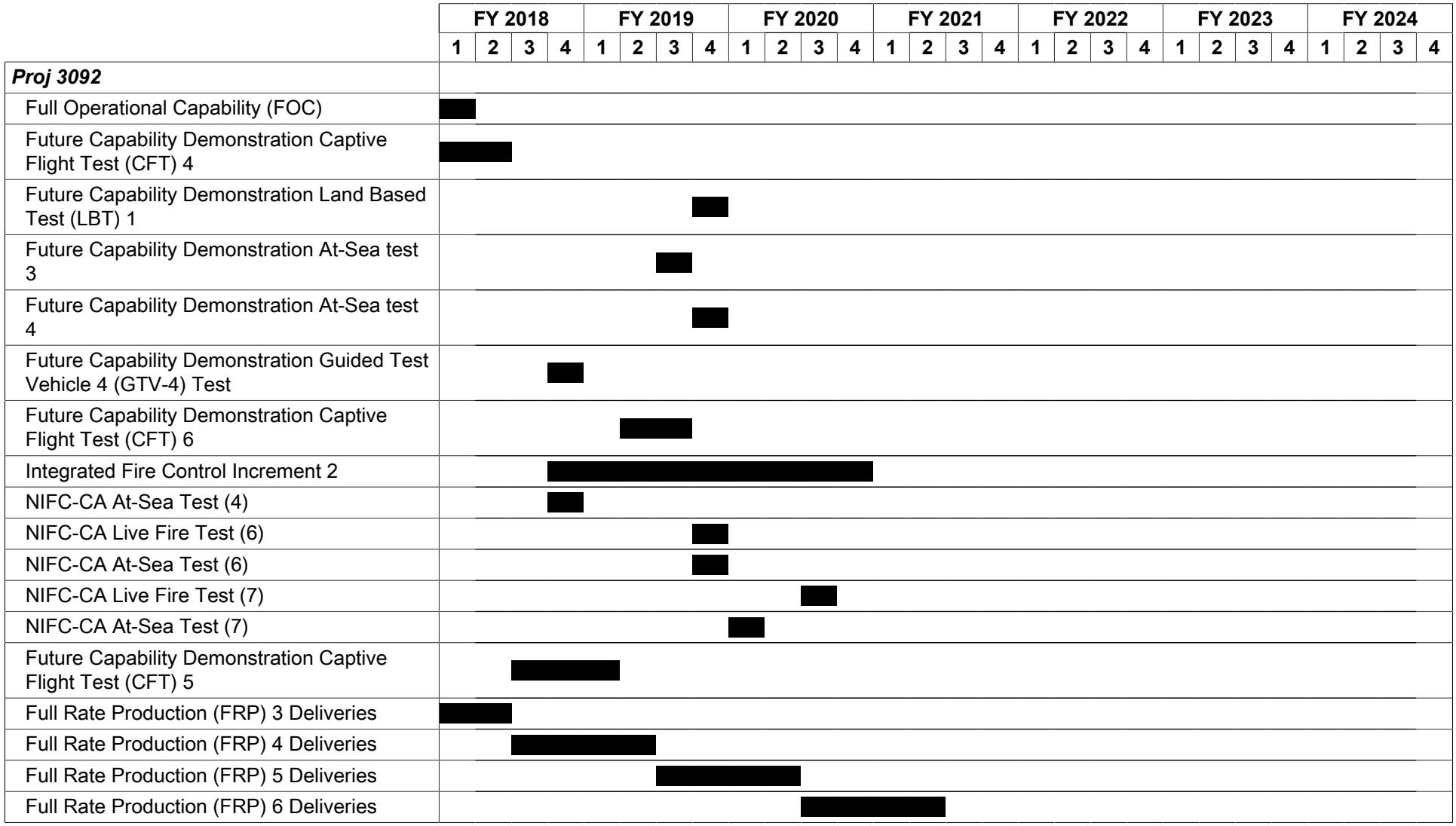
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Services | C/CPAF | VARIOUS : Various | 36.243 | 4.117 | Nov 2017 | 4.504 | Nov 2018 | 2.000 | Nov 2019 | - | | 2.000 | 0.000 | 46.864 | - |
| Travel | Various | IWS3 : Arlington, VA | 1.415 | 0.063 | Nov 2017 | 0.123 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | 0.000 | 1.701 | - |
| DAWDF | C/FP | Not Specified : Not Specified | 1.130 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.130 | - |
| | | **Subtotal** | 38.788 | 4.180 | | 4.627 | | 2.100 | | - | | 2.100 | 0.000 | 49.695 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>3092 / *Standard Missile 6 Program* | |

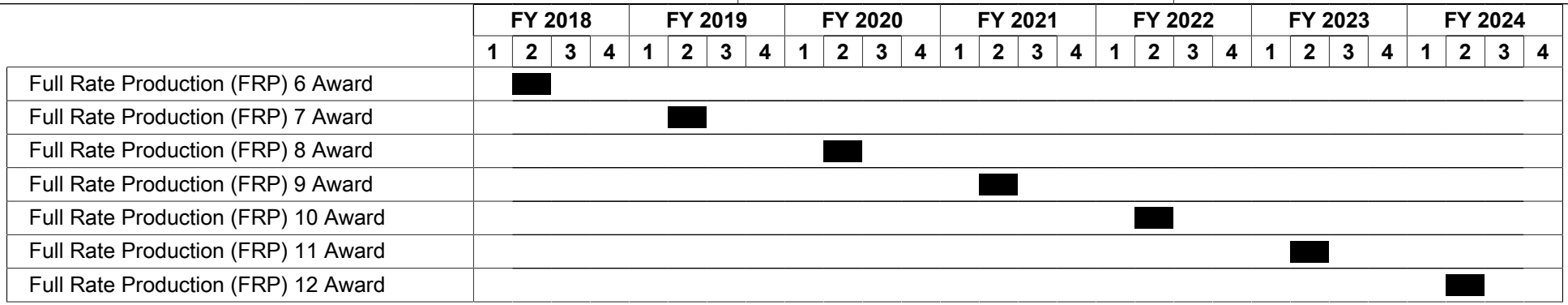
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,290.666 | 90.532 | | 55.823 | | 33.158 | | - | | 33.158 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3092*** | | | | |
| Full Operational Capability (FOC) | 1 | 2018 | 1 | 2018 |
| Future Capability Demonstration Captive Flight Test (CFT) 4 | 1 | 2018 | 2 | 2018 |
| Future Capability Demonstration Land Based Test (LBT) 1 | 4 | 2019 | 4 | 2019 |
| Future Capability Demonstration At-Sea test 3 | 3 | 2019 | 3 | 2019 |
| Future Capability Demonstration At-Sea test 4 | 4 | 2019 | 4 | 2019 |
| Future Capability Demonstration Guided Test Vehicle 4 (GTV-4) Test | 4 | 2018 | 4 | 2018 |
| Future Capability Demonstration Captive Flight Test (CFT) 6 | 2 | 2019 | 3 | 2019 |
| Integrated Fire Control Increment 2 | 4 | 2018 | 4 | 2020 |
| NIFC-CA At-Sea Test (4) | 4 | 2018 | 4 | 2018 |
| NIFC-CA Live Fire Test (6) | 4 | 2019 | 4 | 2019 |
| NIFC-CA At-Sea Test (6) | 4 | 2019 | 4 | 2019 |
| NIFC-CA Live Fire Test (7) | 3 | 2020 | 3 | 2020 |
| NIFC-CA At-Sea Test (7) | 1 | 2020 | 1 | 2020 |
| Future Capability Demonstration Captive Flight Test (CFT) 5 | 3 | 2018 | 1 | 2019 |
| Full Rate Production (FRP) 3 Deliveries | 1 | 2018 | 2 | 2018 |
| Full Rate Production (FRP) 4 Deliveries | 3 | 2018 | 2 | 2019 |
| Full Rate Production (FRP) 5 Deliveries | 3 | 2019 | 2 | 2020 |
| Full Rate Production (FRP) 6 Deliveries | 3 | 2020 | 2 | 2021 |
| Full Rate Production (FRP) 6 Award | 2 | 2018 | 2 | 2018 |
| Full Rate Production (FRP) 7 Award | 2 | 2019 | 2 | 2019 |
| Full Rate Production (FRP) 8 Award | 2 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>3092 / *Standard Missile 6 Program* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Full Rate Production (FRP) 9 Award | 2 | 2021 | 2 | 2021 |
| Full Rate Production (FRP) 10 Award | 2 | 2022 | 2 | 2022 |
| Full Rate Production (FRP) 11 Award | 2 | 2023 | 2 | 2023 |
| Full Rate Production (FRP) 12 Award | 2 | 2024 | 2 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 25.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

STANDARD Missile 6 Electronics Unit funding is for the design, systems engineering, analysis, integration, and test of replacements for obsolete components. Funding will be combined with Missile Defense Agency funding for a shared approach to obsolescence and improved capability in defense of the sea base captured within the SM-6 Dual Increment 3 program. Initial funding is for the requirements generation, risk reduction/mitigation, and establishment of development facilities necessary for the commencement of the obsolescence project. Capability improvements are limited to those required by Missile Defense Agency. The Missile Defense Agency is the contracting office and expect a RFP issued in Q4FY18 with contract award in Q2FY19.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** SM-6 Electronics Unit | 0.000 | 25.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** Contract award to Raytheon Missile Systems is expected Q3FY19 followed by a missiles Systems Requirement Review / Systems Functional Review in Q3FY19.<br>FY19 funding will be used to purchase hardware to modernize existing SM-6<br>Block IA development infrastructure. | | |
| **Congressional Adds Subtotals** | 0.000 | 25.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

SM-6 Acquisition Strategy signed by OSD AT&L 14 March 2012.

**E. Performance Metrics**

USN funds will be directly sent to MDA per the DD 1144 in the Q3FY19 period to support contract award.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604366N / *Standard Missile Improvements* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Design and Analysis | C/CPFF | Raytheon : Tucson, AZ | 0.000 | 0.000 | | 20.500 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 20.500 | - |
| Design and Analysis | C/CPFF | JHU/APL : Laurel, Md | 0.000 | 0.000 | | 2.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 22.500 | | 0.000 | | - | | 0.000 | 0.000 | 22.500 | N/A |

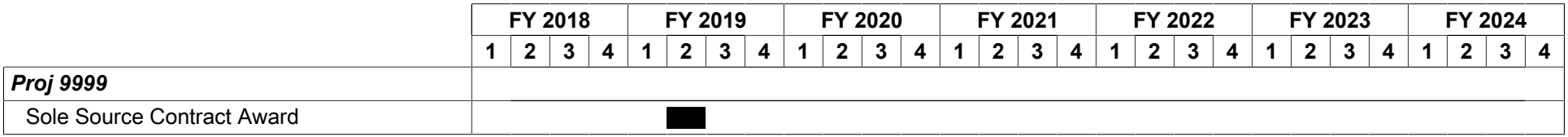
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | Various : Various | 0.000 | 0.000 | | 2.500 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.500 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 2.500 | | 0.000 | | - | | 0.000 | 0.000 | 2.500 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 25.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604366N / *Standard Missile Improvements* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Sole Source Contract Award | 2 | 2019 | 2 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604373N *I Airborne Mine Countermeasures (AMCM)* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 201.919 | 15.203 | 8.351 | 10.916 | - | 10.916 | 10.916 | 11.099 | 11.328 | 11.555 | Continuing | Continuing |
| 2473: *Airborne Mine Neutralization System* | 149.840 | 3.346 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 153.186 |
| 4026: *Strat Into Medal, Tactics & Trng Organic Force* | 44.967 | 10.647 | 7.439 | 9.984 | - | 9.984 | 9.963 | 10.127 | 10.336 | 10.543 | Continuing | Continuing |
| 9179: *Surf Navy Integ Undersea Tactical Tech* | 7.112 | 1.210 | 0.912 | 0.932 | - | 0.932 | 0.953 | 0.972 | 0.992 | 1.012 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This program element provides resources to develop advanced Mine Countermeasures (MCM) equipment systems to counter known and projected mine threats. The MCM systems provide mobile, quick reaction forces capable of land or sea-based minehunting and minesweeping operations worldwide. Resources are for developing and deploying advanced mine-hunting systems and the intelligence and oceanographic capabilities that will enable mine warfare superiority. Tactics and techniques used vary across a diversity of environments and threats, including both asymmetric and emerging. Resources provide for systems and support of mine warfare systems, maritime systems, and expeditionary systems to allow
for continuous operations of the Navy's warships and support vessels, other military vessels, and commercial vessels. Core capabilities include forward presence, deterrence, sea control, power projection, maritime security, humanitarian assistance and disaster response to maintain freedom of the seas. Capability improvements include conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, reducing post-mission analysis time, reducing detect, classify, and identify decision time, improving neutralization time, improving network communications, automatic target recognition, and achieving in-stride detect-to-engage capability. Concept of operations includes development of cooperative, modular systems with a common post mission analysis system providing advanced tools to automate the complex problem of contact management for the thousands of recorded detections, the establishment of capable networked command and control systems, and standing up an accurate and interactive environmental system with the ability to form and disseminate a Common Environmental Picture. Other areas of importance include search and rescue, surface fire support, ASW operations, protection/offense against small craft/vehicles, air to air operations, very shallow water MCM, swimmer defense and torpedo defense.
Efforts benefit the MCM force by transforming the Navy from the platform-centered legacy set of systems to a capability-centered force that is distributed, networked, and able to provide unique maritime influence and access across the entire maritime domain.

The Airborne Mine Countermeasures (AMCM) programs will provide detection, classification, localization, identification, neutralization, and influence sweep capabilities. This capability will be of critical importance in littoral zones, confined straits, choke points, and the Amphibious Objective Area (AOA).

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604373N *I Airborne Mine Countermeasures (AMCM)* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 15.734 | 10.831 | 10.916 | - | 10.916 |
| Current President's Budget | 15.203 | 8.351 | 10.916 | - | 10.916 |
| Total Adjustments | -0.531 | -2.480 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -2.480 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.531 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

Program Adjustments:

FY18: -$531K total adjustments; SBIR -$531K

FY19: -$2,480K total adjustments; -$2,480K Congressional reduction for Project 4026 schedule delays

FY20: No changes

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | | | | Project (Number/Name)<br>2473 / *Airborne Mine Neutralization System* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2473: *Airborne Mine Neutralization System* | 149.840 | 3.346 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 153.186 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Airborne Mine Neutralization System (AMNS) is deployed from the MH-60S and MH-53E helicopters.

The AMNS (Archerfish) will be deployed from the MH-60S helicopter with the capability to neutralize bottom and moored mines using an expendable mine neutralization device. These systems will provide organic airborne mine neutralization capability which will be of critical importance in littoral zones, confined straits, choke points and the Amphibious Objective Area (AOA).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AMNS: Development/Engineering Support | 3.046 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AMNS: Test and Evaluation | 0.138 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AMNS: Management Services | 0.162 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>2473 / *Airborne Mine Neutralization System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.346 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 4248: *Aviation Mine Countermeasures* | 19.297 | 11.299 | 19.250 | - | 19.250 | 6.732 | 4.536 | 4.629 | 4.722 | 0.000 | 547.474 |
| • WPN 4225: *Airborne Mine Neutralization Systems* | 16.925 | 21.465 | 7.160 | - | 7.160 | 13.425 | 12.772 | 9.739 | 9.934 | Continuing | Continuing |
| • OPN 1601: *LCS MCM Mission Modules* | 45.146 | 98.901 | 197.129 | - | 197.129 | 222.831 | 222.523 | 233.151 | 243.503 | 1,213.078 | 2,655.367 |

**Remarks**

The above funding lines account for several programs, of which AMNS is only a portion.

**D. Acquisition Strategy**

The Navy has successfully completed Developmental Testing (Inert) on MH-60S, and conducted TECHEVAL tests on a littoral combat ship (LCS) with the MH-60S. The Navy has awarded a sole source contract to BAE for neutralizer procurements (WPN) to accompany the Launch and Handling Systems (LHS).

**E. Performance Metrics**

Successful completion of Testing and initial operating capability (IOC) was achieved in November 2016.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>2473 / *Airborne Mine Neutralization System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AMNS Hardware/Software Development | Various | Various : Various | 3.359 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.359 | - |
| AMNS Hardware/Software Development | WR | NSWC PC : Panama City, FL | 11.869 | 1.367 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.236 | - |
| AMNS Hardware/Software Development | C/CPAF | Raytheon : Portsmouth, RI | 31.680 | 1.679 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.359 | - |
| AMNS Hardware/Software Development | SS/CPIF | Lockheed Martin : Syracuse, NY | 3.331 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.331 | - |
| | | **Subtotal** | 50.239 | 3.046 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 53.285 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AMNS Development Test & Evaluation | SS/CPFF | Lockheed Martin : Syracuse, NY | 1.254 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.254 | - |
| AMNS Operational Test & Evaluation | SS/CPFF | Lockheed Martin : Syracuse, NY | 0.767 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.767 | - |
| AMNS Test Assets | C/CPIF | Raytheon : Portsmouth, RI | 3.310 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.310 | - |
| AMNS Development Test & Evaluation | WR | NSWC, PC : Panama City, FL | 38.291 | 0.138 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 38.429 | - |
| AMNS Development Test & Evaluation | C/CPIF | Raytheon : Portsmouth, RI | 17.543 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.543 | - |
| AMNS Operational Test & Evaluation | WR | COTF : Norfolk, VA | 20.095 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.095 | - |
| | | **Subtotal** | 81.260 | 0.138 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 81.398 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>2473 / *Airborne Mine Neutralization System* | |

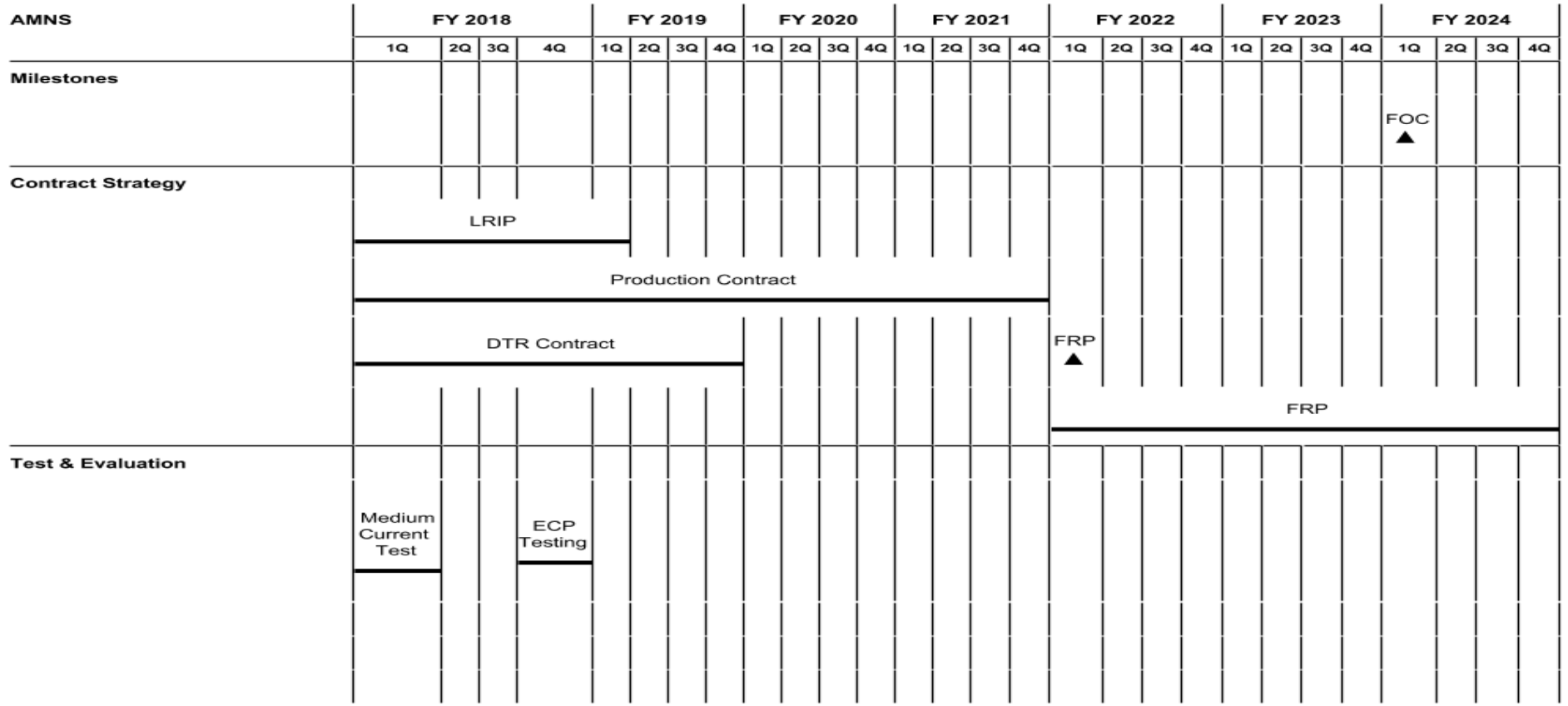
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AMNS Management Support | WR | NSWC PC : Panama City, FL | 0.591 | 0.081 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.672 | - |
| AMNS Program Management Support | C/CPFF | Various : Various | 7.355 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.355 | - |
| AMNS Program Management Support | C/CPIF | Raytheon : Portsmouth, RI | 2.731 | 0.081 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.812 | - |
| AMNS Program Management Support | Various | Field Activity : Various | 2.352 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.352 | - |
| AMNS Travel | Allot | NAVSEA : Washington, DC | 0.159 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.159 | - |
| DAWDF | Sub Allot | NAVSEA : Washington, DC | 5.153 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.153 | - |
| | | **Subtotal** | 18.341 | 0.162 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 18.503 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 149.840 | 3.346 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 153.186 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>2473 / *Airborne Mine Neutralization System* |




2020DON - 0604373N - 2473

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>2473 / *Airborne Mine Neutralization System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***AMNS*** | | | | |
| Milestones: Full Operational Capability | 1 | 2024 | 1 | 2024 |
| Contract Strategy: Low Rate Initial Production | 1 | 2018 | 1 | 2019 |
| Contract Strategy: Production Contract | 1 | 2018 | 4 | 2021 |
| Contract Strategy: Destructor Contract | 1 | 2018 | 4 | 2019 |
| Contract Strategy: Full Rate Production | 1 | 2022 | 1 | 2022 |
| Contract Strategy: Full Rate Production Contract | 1 | 2022 | 4 | 2024 |
| Test & Evaluation: Medium Current Test | 1 | 2018 | 1 | 2018 |
| Test & Evaluation: Engineering Change Proposal Testing | 4 | 2018 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4026: *Strat Into Medal, Tactics & Trng Organic Force* | 44.967 | 10.647 | 7.439 | 9.984 | - | 9.984 | 9.963 | 10.127 | 10.336 | 10.543 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The C4I, Tactics, Mission Planning (CTMP), and Post Mission Analysis (PMA) program is an initiative that has evolved into both developing MEDAL modules for each next generation MCM system as well as developing next generation Tactics. Additionally, CTMP provides threat data and system requirements and capabilities to the Mine Warfare and Environmental Decisions Aid Library (MEDAL) software development effort. Finally, CTMP develops Net-Centric Sensor Analysis for Mine Warfare (NSAM) as an open systems architecture (OSA) with compliant plug-ins of common post-mission analysis tools for next generation MCM sensor data. NSAM will replace the Organic Post-Mission Analysis (OPMA) system and other stand alone system PMA tools.

NSAM analysis tools will provide the capability to perform tactical and environmental PMA on data collected from various MCM sensor systems. NSAM will be developed in incremental builds. The goal is to reduce the mission timeline and increase the mission effectiveness with respect to mission analysis. NSAM will have a training mode to maintain operator proficiency and PMA skill set. NSAM will be the replacement for Organic Post Mission Analysis (OPMA) in the Fleet, integrating ALMDS, AMNS, AN/AQS-20 Sensor PMA into the first delivered Fleet Build. Future incremental builds will add support for additional MCM sensors and weapons systems. NSAM provides multi-data set, multi-user, tactical & environmental PMA, contact management. OSA and Agile software development processes will reduce the cost for adding future MCM systems. The analysis results from PMA are provided to the MEDAL, reducing false call reporting for tactical decision making. NSAM will implement cybersecurity requirements using the new Risk Management Framework (RMF) process.

The tactics training organic force is supported with integrated tactics development, theory development, and integrated tactics training. To date, the project has been focused on the Littoral Combat Ship (LCS) with support to MCM Mission Module (MM) detachments (DETs) and Aviation detachments (AVDETs) and all the related integrated tactics support from planning, execution, post-mission analysis and includes to contact management automation methods. Additional efforts that the project supports include doctrinal updates, as well as new overall MCM development.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** NSAM Product Development | 5.092 | 3.831 | 5.127 | 0.000 | 5.127 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Deliver OPMA 1.3.11 update.<br>Complete NSAM software development Build 1.0, which includes support for ALMDS AMNS, and AN/AQS-20A Mine hunting sonar. Begin development of requirements package for Build 1.1, defining functional capabilities for the build. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue applying risk management framework (RMF) processes to achieve an authority to operate (ATO) for Build 1.0.<br>Continue tailoring and generating logistics documents as required for supporting software intensive systems.<br>***FY 2020 Base Plans:***<br>Continue NSAM software development based on the requirements package for Build 1.1. Continue applying RMF guidelines and implement continuous monitoring strategy to continue to adhere to the ATO requirements.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Apparent increase in funding from FY19 to FY20 reflects FY19 Congressional reduction. Funding in FY20 supports deferred scope of Build 1.1 efforts. | | | | | |
| ***Title:*** Engineering Services/ILS: | 3.809 | 2.455 | 3.285 | 0.000 | 3.285 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Commence the NSAM software engineering and requirements review for Build 1.1, establish the build requirements definition package (BDP) and obtain approvals to initiate NSAM Build 1.1. Assess requirements and maturity of candidate systems for potential inclusion in NSAM Build 1.1. Provide dedicated engineering support for integration with the Mission Package Application Software (MPAS) lab. Develop specifications and interface documentation to inform future systems' integration with NSAM.<br>Execute tactics development in accordance with fleet-determined priorities established through the Integrated MCM Overarching Technical Group (IMCM OTG) that give the Fleet staffs a voice for reporting and addressing tactical issues at the integrated level. Complete the Attrition Tactics guidance and include the effects of enemy minefield re-seeding; perform the analysis to expand the Navy Tactical Reference Publication (NTRP) 3-15.2.2 Susceptibility of Ships to Threat Mines with additional mine chapters for various Navy ships. Complete investigation and document Intelligence Preparation of the Environment (IPOE) gaps in LCS MCM MP Tactics.<br>***FY 2020 Base Plans:***<br>Perform systems engineering and cybersecurity tasks to support NSAM Build 1.1 development. Continue development of specifications and interface documentation to inform future systems' integration with NSAM. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue updates for the "Susceptibility of Ships to Threat Mines," Navy Tactical Reference Publication (NTRP) 3-15.2.2: Complete chapters for additional Mines for Fleet validated ship list. Support training needs for AMNS, ALMDS and AN/ AQS-20 post IOT&E and for Increment 2 of the MCM MP. Develop "Airborne Mine Countermeasures (AMCM) (U) Navy Tactics, Training, and Procedure (NTTP) Volume II, 3.15.22".<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Apparent increase in funding from FY19 to FY20 reflects FY19 Congressional reduction. Funding in FY20 supports deferred scope of Build 1.1 efforts. | | | | | |
| ***Title:*** Test and Evaluation<br>***Articles:***<br>***FY 2019 Plans:***<br>Continue development of NSAM Build 1.0 test procedures and support quarterly engineering deliveries to the LCS mission package application software lab for preliminary integration.<br>***FY 2020 Base Plans:***<br>Complete test preparations and begin NSAM Build 1.0 developmental test and evaluation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Apparent increase in funding from FY19 to FY20 reflects FY19 Congressional reduction. Funding in FY20 supports deferred scope of Build 1.1 efforts. | 1.458<br>- | 0.921<br>- | 1.249<br>- | 0.000<br>- | 1.249<br>- |
| ***Title:*** Management Support<br>***Articles:***<br>***FY 2019 Plans:***<br>Plan, track, follow-up and report on cost, schedule, and performance status of the project.<br>***FY 2020 Base Plans:***<br>Continue to plan, track, follow-up and report on cost, schedule, and performance status of the project.<br>***FY 2020 OCO Plans:*** | 0.288<br>- | 0.232<br>- | 0.323<br>- | 0.000<br>- | 0.323<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No significant change from FY 2019 to FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.647 | 7.439 | 9.984 | 0.000 | 9.984 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The Organic Post-Mission Analysis (OPMA) capability for the OAMCM systems was developed by NSWC PCD, Panama City, FL. NSAM will merge capabilities of OPMA and NAVO's Environmental PMA (EPMA) capabilities into an Open Architecture framework. Build 1 will utilize government teams NSWC PCD and Naval Research Laboratory - Stennis Space Center (NRL-SSC) to expedite fielding significant contact management improvements, data fusion techniques, and environmental PMA.

The tactics development, tactics training, and tactics algorithms/database efforts are performed by NSWC PCD. These efforts will provide reach back support as the OAMCM systems begin to be fielded; will develop modifications to environmental databases necessary to support OAMCM mission planning; will update the MIW Tactics Continuum to address OAMCM; and will update the gear and mine database for threats addressed by the OAMCM systems.

**E. Performance Metrics**

Successfully integrate NSAM into LCS Mission Package and provide Training Material to AMCM Detachments. Deliver Mine Warfare Naval Tactical Publications and TACMEMOs to NWDC in publication-ready formats in support of MCM Staffs and LCS MCM MP Operators.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Software Development | WR | NSWC PCD : Panama City FL | 25.043 | 4.084 | Oct 2017 | 3.241 | Nov 2018 | 4.230 | Nov 2019 | - | | 4.230 | Continuing | Continuing | Continuing |
| Hardware/Software Development | WR | NRL-SSC : Bay St. Louis, MS | 2.443 | 1.008 | Dec 2017 | 0.590 | Dec 2018 | 0.897 | Nov 2019 | - | | 0.897 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 27.486 | 5.092 | | 3.831 | | 5.127 | | - | | 5.127 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Services | WR | SSC-PAC : Various | 0.040 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.040 | - |
| Engineering Services | WR | NSWC PCD : Panama City FL | 11.739 | 2.790 | Nov 2017 | 1.512 | Nov 2018 | 2.098 | Nov 2019 | - | | 2.098 | Continuing | Continuing | Continuing |
| Engineering Services | WR | NRL-SSC : Bay St. Louis, MS | 0.844 | 0.238 | Dec 2017 | 0.327 | Dec 2018 | 0.328 | Nov 2019 | - | | 0.328 | Continuing | Continuing | Continuing |
| ILS | WR | NSWC PC : Panama City FL | 2.158 | 0.781 | Nov 2017 | 0.616 | Nov 2018 | 0.859 | Nov 2019 | - | | 0.859 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 14.781 | 3.809 | | 2.455 | | 3.285 | | - | | 3.285 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NSAM Test and Evaluation | WR | NSWC PC : Panama City, FL | 0.612 | 1.054 | Oct 2017 | 0.806 | Nov 2018 | 0.775 | Nov 2019 | - | | 0.775 | 0.000 | 3.247 | - |
| NSAM Test and Evaluation | WR | NRL-SSC : Bay St Louis, MS | 0.128 | 0.404 | Nov 2017 | 0.115 | Dec 2018 | 0.124 | Nov 2019 | - | | 0.124 | 0.000 | 0.771 | - |
| NSAM Test & Evaluation | WR | JHU-APL : Laurel, MD | 0.000 | 0.000 | | 0.000 | | 0.350 | Nov 2019 | - | | 0.350 | 0.000 | 0.350 | - |
| | | **Subtotal** | 0.740 | 1.458 | | 0.921 | | 1.249 | | - | | 1.249 | 0.000 | 4.368 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* | |

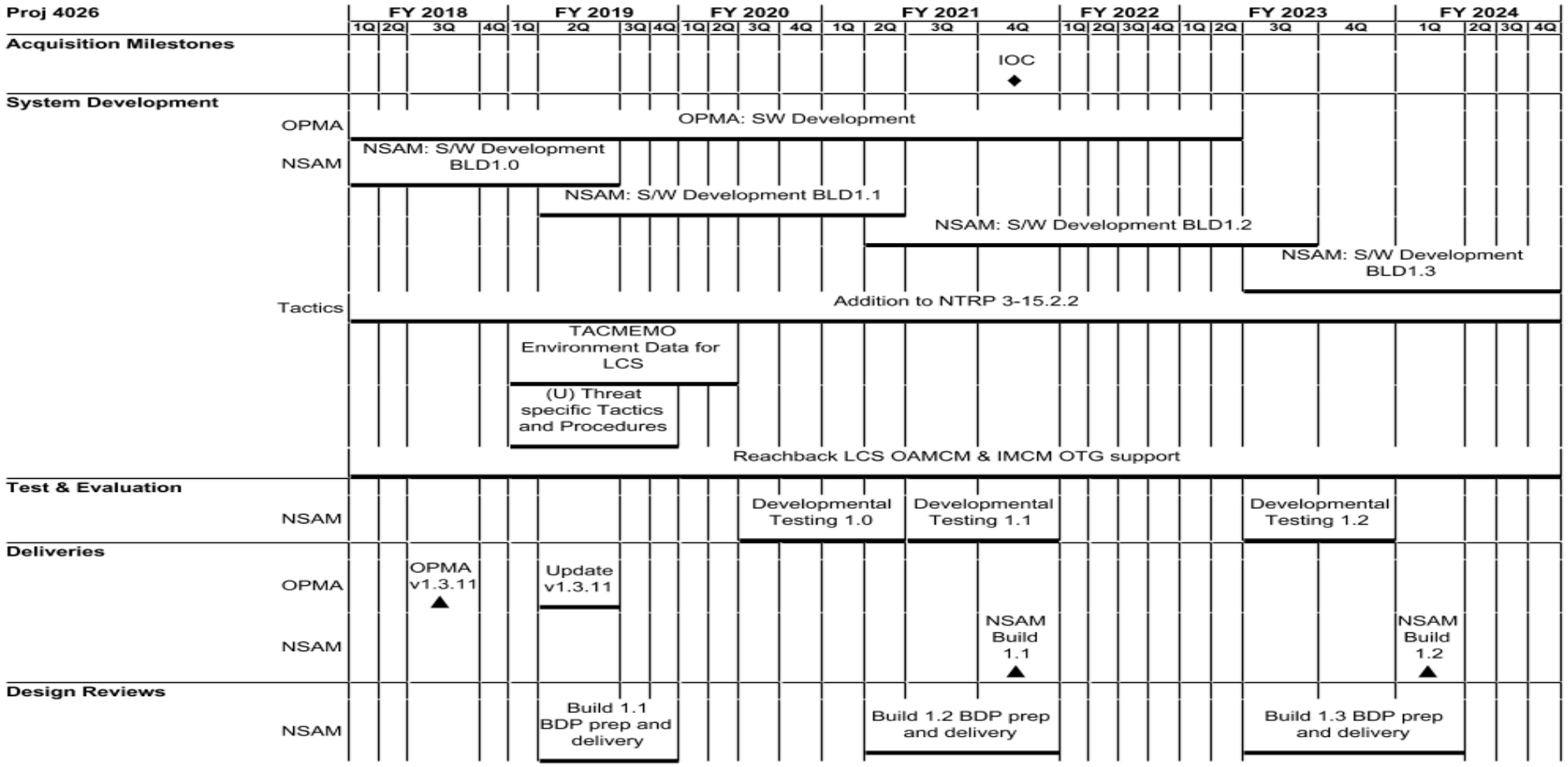
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Support | WR | NSWC PC : Panama City FL | 1.947 | 0.288 | Nov 2017 | 0.232 | Nov 2018 | 0.323 | Nov 2019 | - | | 0.323 | Continuing | Continuing | Continuing |
| Acquisition Workforce Fund | Various | Various : Various | 0.013 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.013 | - |
| | | **Subtotal** | 1.960 | 0.288 | | 0.232 | | 0.323 | | - | | 0.323 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 44.967 | 10.647 | | 7.439 | | 9.984 | | - | | 9.984 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* |




*2020PB - 0604373N - 4026*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4026*** | | | | |
| Acquisition Milestones: NSAM: Initial Operational Capability | 4 | 2021 | 4 | 2021 |
| System Development: OPMA: OPMA: Maintain & Support; Software | 1 | 2018 | 2 | 2023 |
| System Development: NSAM: NSAM: S/W Development Build 1.0 | 1 | 2018 | 2 | 2019 |
| System Development: NSAM: NSAM: S/W Development Build 1.1 | 2 | 2019 | 2 | 2021 |
| System Development: NSAM: NSAM: S/W Development Build 1.2 | 2 | 2021 | 3 | 2023 |
| System Development: NSAM: NSAM: S/W Development Build 1.3 | 3 | 2023 | 4 | 2024 |
| System Development: Tactics: Add additional Mines to NTRP 3-15.2.2 Susceptibility of Ships to Threat Mines | 1 | 2018 | 4 | 2024 |
| System Development: Tactics: Tactics: TACMEMO Environment Data for LCS MCM Systems | 1 | 2019 | 2 | 2020 |
| System Development: Tactics: Tactics: (U) Threat specific Tactics and Procedures | 1 | 2019 | 4 | 2019 |
| System Development: Tactics: Tactics: Reachback LCS OAMCM & IMCM OTG support | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: NSAM: NSAM: Developmental Testing 1.0 | 3 | 2020 | 2 | 2021 |
| Test & Evaluation: NSAM: NSAM: Developmental Testing 1.1 | 3 | 2021 | 4 | 2021 |
| Test & Evaluation: NSAM: NSAM: Developmental Testing 1.2 | 3 | 2023 | 4 | 2023 |
| Deliveries: OPMA: OPMA: Deliver OPMA v1.3.11 for LCS | 3 | 2018 | 3 | 2018 |
| Deliveries: OPMA: OPMA: Update OMN v1.3.11 for LCS | 2 | 2019 | 2 | 2019 |
| Deliveries: NSAM: NSAM: Capability Drop Build 1.1 | 4 | 2021 | 4 | 2021 |
| Deliveries: NSAM: NSAM: Capability Drop Build 1.2 | 1 | 2024 | 1 | 2024 |
| Design Reviews: NSAM: NSAM: Build 1.1 Build Development Package (BDP) | 2 | 2019 | 4 | 2019 |
| Design Reviews: NSAM: NSAM: Build 1.2 Build Development Package (BDP) | 2 | 2021 | 4 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>4026 / *Strat Into Medal, Tactics & Trng Organic Force* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Design Reviews: NSAM: NSAM: Build 1.3 Build Development Package (BDP) | 3 | 2023 | 1 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>9179 / *Surf Navy Integ Undersea Tactical Tech* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9179: *Surf Navy Integ Undersea Tactical Tech* | 7.112 | 1.210 | 0.912 | 0.932 | - | 0.932 | 0.953 | 0.972 | 0.992 | 1.012 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Surface Navy Integrated Undersea Tactical Technology (SNIUTT) is software that provides Post Mission Analysis (PMA) classroom and operator training to teach mine contact recognition when performing PMA for MCM sonar, Light Detecting and Ranging (LIDAR), Electro Optical Identification, and camera sensors. This same application at the squadron level allows operators to maintain and even improve proficiency. SNIUTT will be used to develop an AN/SQQ-32, and AN/AQS-24B/C sensor training modules. SNIUTT is also used for LCS MCM Mission Package Airborne Mine Countermeasures (AMCM) sensor training modules for systems such as ALMDS, COBRA and MCM-USV towed AN/AQS-20A/C sensor training modules. The software runs in conjunction existing PMA systems to both reinforce training of PMA procedures and present real sensor data.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Hardware and Software Development | 0.965 | 0.819 | 0.827 | 0.000 | 0.827 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to update the AN/AQS-24B, and ALMDS sonar training modules and support development for imbedded operator training in the Net-Centric Sensor Analysis for Mine Warfare (NSAM) application. Begin development of a capability to track individual operator PMA performance as the individual uses the training software over time. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete update to the AN/AQS-24B, and ALMDS sonar training module. Support development for imbedded operator training in the Net-Centric Sensor Analysis for Mine Warfare (NSAM) application, and Complete capability to track individual operator PMA performance over time. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No significant change from FY 2019 to FY 2020. | | | | | |
| ***Title:*** Engineering and Integration and Logistics Services | 0.245 | 0.093 | 0.105 | 0.000 | 0.105 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>9179 / *Surf Navy Integ Undersea Tactical Tech* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue to provide SNIUTT In Service Engineering Agent (ISEA) training, and documentation support.<br>***FY 2020 Base Plans:***<br>Continue to provide SNIUTT In Service Engineering Agent (ISEA) training, and documentation support.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No significant change from FY 2019 to FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.210 | 0.912 | 0.932 | 0.000 | 0.932 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Surface Navy Integrated Undersea Tactical Technology(SNIUTT) has been used to develop AN/SQQ-32, AN/AQS-24 and AN/AQS-20A sensor training modules. Funds will continue to support training for these sonar systems, as well as training for the Remote Environmental Measuring Units (REMUS) sonar systems and other OAMCM systems such as AMNS, ALMDS and COBRA in the same format as previous training. The SNIUTT sensor training modules will be developed by NSWC PCD, Panama City, FL. Funds are being provided for development and delivery of refresher scenario based contact recognition training, and the update and modification of contact recognition training (interactive web based training) to support the delivery of SNIUTT to fleet operators.

**E. Performance Metrics**

Successfully integrate SNIUTT into the school house training facility and provide to AMCM detachments for operator PMA refresher and proficiency training.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | Project (Number/Name)<br>9179 / *Surf Navy Integ Undersea Tactical Tech* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Software Development | WR | NSWC PC : Panama City FL | 6.088 | 0.965 | Oct 2017 | 0.819 | Oct 2018 | 0.827 | Oct 2019 | - | | 0.827 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.088 | 0.965 | | 0.819 | | 0.827 | | - | | 0.827 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ISEA | WR | NSWC, PC : Panama City FL | 1.021 | 0.245 | Oct 2017 | 0.093 | Oct 2018 | 0.105 | Oct 2019 | - | | 0.105 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.021 | 0.245 | | 0.093 | | 0.105 | | - | | 0.105 | Continuing | Continuing | N/A |

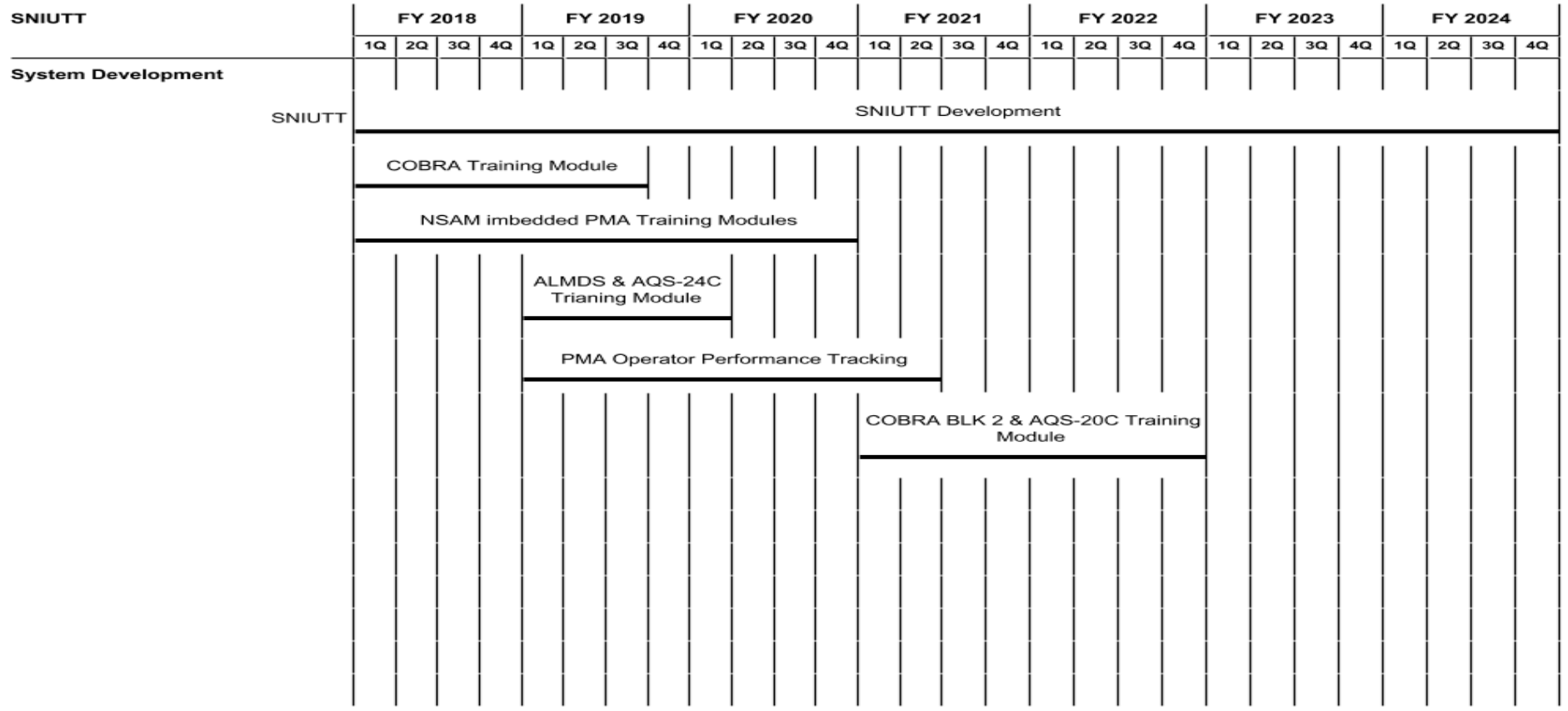
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAWDF | Various | Various : Various | 0.003 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.003 | - |
| | | **Subtotal** | 0.003 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.003 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7.112 | 1.210 | | 0.912 | | 0.932 | | - | | 0.932 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>9179 / *Surf Navy Integ Undersea Tactical Tech* |




*2020DON - 0604373N - 9179*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604373N / *Airborne Mine Countermeasures (AMCM)* | **Project (Number/Name)**<br>9179 / *Surf Navy Integ Undersea Tactical Tech* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***SNIUTT*** | | | | |
| System Development: SNIUTT: SNIUTT | 1 | 2018 | 4 | 2024 |
| System Development: SNIUTT: COBRA Training Module | 1 | 2018 | 3 | 2019 |
| System Development: SNIUTT: NSAM imbedded PMA Training Modules | 1 | 2018 | 4 | 2020 |
| System Development: SNIUTT: ALMDS and AQS-24C Training Module | 1 | 2019 | 1 | 2020 |
| System Development: SNIUTT: PMA Operator Performance Tracking | 1 | 2019 | 2 | 2021 |
| System Development: SNIUTT: COBRA BLK 2 & AQS-20C Training Module | 1 | 2021 | 4 | 2022 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604378N *I Nav Integrated Fire Control-Counter Air Sys Eng* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 214.445 | 24.801 | 33.429 | 33.379 | - | 33.379 | 35.846 | 35.116 | 34.835 | 35.534 | Continuing | Continuing |
| 3159: *Naval Integrated Fire Control-Counter Air SE&I* | 214.445 | 24.801 | 33.429 | 24.379 | - | 24.379 | 26.846 | 26.116 | 25.835 | 26.354 | Continuing | Continuing |
| 3242: *NIFC-CA Supported by Airborne Platforms* | 0.000 | 0.000 | 0.000 | 9.000 | - | 9.000 | 9.000 | 9.000 | 9.000 | 9.180 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $2.000 million to account for the availability of prior year execution balances.

3159 Naval Integrated Fire Control (NIFC) Systems Engineering Integration and Test (SEI&T) project is a systems engineering effort to extend the Naval Integrated Air and Missile Defense battlespace out to the maximum kinematic range of our weapons for the air, surface, and strike warfare missions. This includes targets beyond the detection range of the shooter. The NIFC project exploits capabilities inherent in existing systems, optimizes current and emerging technologies in component system upgrades, integrates them together, and performs kill chain tests, forming an interoperable System of Systems (SoS) to maximize future defense capabilities. As directed by OPNAV, the project is focused on SEI&T efforts to integrate the From The Sea (FTS) family of kill chains which includes the E-2D Advanced Hawkeye, Cooperative Engagement Capability (CEC), AEGIS, and SM-6 missile along with other networks and sensors The From the Air (FTA) family of kill chains consisting of surveillance platforms, tactical aircraft, data links, and air-launched weapons. This PE will support efforts including system definition and architecture development, performance prediction, performance assessment, system test and risk reduction efforts, system analysis, modeling and simulation, and capability demonstrations for the FTS and FTA families of kill chains. The project also facilitates the development of the concept of operations with the warfighter to maximize effectiveness when deployed with the Fleet.

3242 Naval Integrated Fire Control (NIFC) From the Air (FTA) Systems Engineering Integration and Test (SEI&T) project is a systems engineering effort to integrate NIFC FTA capabilities within "Pillar Programs" (F/A-18 & EA-18G, E-2D, F-35, Link-16 and Tactical Targeting Network Technology Data Links, and AIM-120 and AIM-9X weapons). Based on the advancing threat, there remains an imperative to improve lethality, survivability and interoperability by extending the battlespace out to the maximum kinematic range of our weapons for the air, surface, and strike warfare missions. The NIFC FTA project leverages capabilities inherent in existing systems, optimizes current and emerging technologies in platform system upgrades, and integrates them together to form interoperable System of Systems (SoS) to maximize offensive and defensive FTA integrated capabilities. As directed from OPNAV, the project is focused on development of Air Warfare, Surface Warfare, and Strike Warfare FTA effects chains. This PU will support efforts that include decomposing SoS requirements into Mission Technical Baselines (MTBs) and Integrated Capability Technical Baselines (ICTBs) for requirement allocation to Pillar Programs. Additionally, this PU will support NIFC pillar program coordination to provide performance predictions, performance assessments, and SoS risk reduction activities through Live, Virtual, and Constructive (LVC) events, SoS exercises, and development of Requirements Test and Verification Matrices (RTVMs) to support Developmental and Operational Test for the individual platforms. In lieu of a traditional Test and Evaluation Master Plan (TEMP), NIFC FTA test strategies will be developed to identify resources required to evaluate NIFC FTA capabilities, and describe how NIFC FTA capabilities will be evaluated prior to fleet delivery.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604378N *I Nav Integrated Fire Control-Counter Air Sys Eng* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 25.445 | 33.429 | 35.439 | - | 35.439 |
| Current President's Budget | 24.801 | 33.429 | 33.379 | - | 33.379 |
| Total Adjustments | -0.644 | 0.000 | -2.060 | - | -2.060 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.644 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -2.059 | - | -2.059 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.001 | - | -0.001 |

**Change Summary Explanation**

FY18 decrease due to SBIR reduction.

FY20 decrease due to $2.000M availability of prior year balances and $0.059M Contractor Services Reform reduction.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3159: *Naval Integrated Fire Control-Counter Air SE&I* | 214.445 | 24.801 | 33.429 | 24.379 | - | 24.379 | 26.846 | 26.116 | 25.835 | 26.354 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

3159 Naval Integrated Fire Control (NIFC) Systems Engineering Integration and Test (SEI&T) project is a systems engineering effort to extend the Naval Integrated Air and Missile Defense battlespace out to the maximum kinematic range of our weapons for the air, surface, and strike warfare missions. This includes targets beyond the detection range of the shooter. The NIFC project exploits capabilities inherent in existing systems, optimizes current and emerging technologies in component system upgrades, integrates them together, and performs kill chain tests, forming an interoperable System of Systems (SoS) to maximize future offensive and defensive integrated capabilities. NIFC consist of two kill chain families called From the Air (FTA) and From the Sea (FTS). As directed by OPNAV, the project is focused on SEI&T efforts to integrate the From The Sea (FTS) kill chains which include the E-2D Advanced Hawkeye, Cooperative Engagement Capability (CEC), AEGIS, and SM-6 missile as well as an increasing set of sensors and networks. The From the Air (FTA) kill chains consisting of surveillance platforms, tactical aircraft, data links, and air-launched weapons. This PE will support efforts including system definition and architecture development, performance prediction, performance assessment, system test and risk reduction efforts, system analysis, modeling and simulation, and capability demonstrations for the FTS kill chain. The project also facilitates the development of the concept of operations with the warfighter to maximize effectiveness when deployed with the Fleet.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Integration and Test (I&T) Integrated Product Team (IPT) | 10.320 | 10.016 | 9.932 | 0.000 | 9.932 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The Integration and Test (I&T) Integrated Product Team (IPT) develops and executes the test plan to assess the FTS operational capability, performs risk reduction testing leveraging various component system tests. Test data will be used over time to verify, validate, and accredit the FTS simulation federation. | | | | | |
| ***FY 2019 Plans:***<br>- NIFC Live Fire tests are scheduled for 2nd and 4th quarter at WSMR and At-Sea respectively.<br>- WSMR Desert Ship Upgrade (DSU) III upgrade has progress and will move towards completion. This configuration supports NIFC Increment 2 testing requirements.<br>- At OPNAV's direction accelerated Life Fire Test 6, focused on TACAIR integration, through systems engineering and test planning as well as complementary federation analysis for a 2nd quarter FY19 WSMR test. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - NIFC tests are scheduled every 9 months but are adjusted based on asset availability including At Sea-7 Blk IA which is currently scheduled for the first quarter of FY20.<br>- The capability assessment from COMOPTEVFOR for NIFC Increment 2 capability will occur in FY20.<br>- Develop LFT-8 WSMR event for FY 21.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 to FY20 decrease of $84K reflects minor adjustment to At-Sea 7 Blk 1A test event. | | | | | |
| ***Title:*** NIFC From the Air (FTA) Capabilities Effectiveness and Integration | 0.000 | 9.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develops and executes multi-platform cross-domain offensive and defensive kinematic and non-kinematic effects chains as directed by OPNAV.<br>***FY 2019 Plans:***<br>NIFC FTA efforts are part of Project Unit 3159 in FY19 but move to Project 3242 starting in FY20. This is not a new start effort.<br>NIFC FTA System of Systems (SoS) verification and validation tests are planned throughout the year, including evaluation of integrated F/A-18E/F and EA-18G H14, E-2D DSSC-3 capabilities, Link-16 Time Differential of Arrival (TDOA), and air/surface launched cruise missiles. Continue FTA Federation lab upgrades. NIFC Increment 3 requirements definition, engineering product development, and risk reduction activities will occur throughout the year.<br>-Coordination of operational test of NIFC-CA Increment 2 capabilities<br>-V&V of Live Virtual Constructive (LVC) functional capabilities<br>- Quarterly FTA LVC events<br>- Planning for NAVAIR SoS exercise<br>- Planning and participation in Navy fleet SUW experimentation<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decrease from FY19 to FY20 due to NIFC FTA efforts moving to Project 3242 starting in FY20. | | | | | |
| ***Title:*** Engineering Management And System Definition | 14.481 | 14.413 | 14.447 | 0.000 | 14.447 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Engineering management and system definition including the development of the Systems Performance Document (SPD), SoS functional allocations, requirements, traceability, SoS trades studies, SoS information exchange requirements, interface specifications, and sensor network capability analysis. Provides for complete FTS kill chain performance analysis and interface verification through development of a federation of simulations provided directly from the FTS Programs of Record. Program of Record include the E-2D Advanced Hawkeye, CEC, AEGIS, and SM-6 missile as well as an expanding set of sensors and networks. Federated SoS simulations support architecture development, scenario development, predictive analysis for testing, and define capabilities and limitations of FTS kill chain performance analysis and interface verification through development of a federation of simulations provided directly from the FTS Programs of Record. Federated SoS simulations support architecture development, scenario development, predictive analysis for testing, and define capabilities and limitations of FTS kill chain for deployment.<br><br>***FY 2019 Plans:***<br>- Continue Desert Ship ACB-16 updates. Updates support program risk reduction testing for NIFC 2019 capability.<br>- Begin follow-on (NIFC Increment 3) System-of-Systems technical definition and requirements.<br>- Conduct one NIFC Inc 2 SM-6 Blk IA Live Fire Event that will demonstrate improved NIFC-CA Inc. 2 capability.<br><br>***FY 2020 Base Plans:***<br>- WSMR ACB-16 updates based on lessons learned and Baseline updates planned to continue through FY20.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>$34K increase from FY19 to FY20 increase to support NIFC-FT Inc 3 Design and Development Phase. Improves capability to address previous gaps and maintain tactical relevance | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 24.801 | 33.429 | 24.379 | 0.000 | 24.379 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0604366N: *Standard Missile SM-6* | 6.018 | 2.988 | 3.213 | - | 3.213 | 5.398 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Not Applicable

**E. Performance Metrics**

Test Program and analysis conducted using the NIFC Federation will provide data to verify NIFC performance with respect to NIFC MOEs, MOPs, and requirements being tracked as NIFC related in the Pillar Programs. NIFC Federation, once validated using test event data, will be used to update the expected performance of NIFC, as required, and provide feedback to Pillar programs.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | Various | Various : Various | 46.834 | 4.323 | Dec 2017 | 0.165 | Dec 2018 | 0.248 | Dec 2019 | - | | 0.248 | 0.000 | 51.570 | - |
| Systems Engineering | C/CPFF | JHU/APL : Laurel, MD | 3.705 | 0.681 | Dec 2017 | 0.714 | Dec 2018 | 0.680 | Dec 2019 | - | | 0.680 | 0.000 | 5.780 | - |
| Systems Engineering | C/CPFF | NGIS : Melbourne, FL | 8.415 | 0.238 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.653 | - |
| Systems Engineering | C/CPFF | LM MS2 : Moorestown, NJ | 38.826 | 10.157 | Dec 2017 | 11.835 | Dec 2018 | 8.095 | Dec 2019 | - | | 8.095 | 0.000 | 68.913 | - |
| Systems Engineering | C/CPFF | Raytheon Co. : St. Petersburg, FL | 14.137 | 0.605 | Oct 2017 | 1.088 | Oct 2018 | 0.460 | Dec 2019 | - | | 0.460 | 0.000 | 16.290 | - |
| Systems Engineering | WR | NSWC CRANE : Crane, IN | 0.000 | 0.090 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.090 | - |
| Systems Engineering | WR | NAWC CHINA LAKE : China Lake, CA | 0.000 | 0.500 | Oct 2017 | 3.295 | Oct 2018 | 1.039 | Dec 2019 | - | | 1.039 | 0.000 | 4.834 | - |
| Systems Engineering | WR | COTF : Norfolk, VA | 0.785 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.785 | - |
| Systems Engineering | WR | NAWC Pax River : Pax River, MD | 0.000 | 0.000 | | 3.295 | Dec 2019 | 2.075 | Dec 2019 | - | | 2.075 | 0.000 | 5.370 | - |
| | | **Subtotal** | 112.702 | 16.594 | | 20.392 | | 12.597 | | - | | 12.597 | 0.000 | 162.285 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration and Test | C/CPFF | Raytheon : St. Petersburg, FL | 7.485 | 0.231 | Dec 2017 | 0.429 | Dec 2018 | 0.325 | Dec 2019 | - | | 0.325 | 0.000 | 8.470 | - |
| Integration and Test | WR | COTF : Norfolk, VA | 0.013 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.013 | - |
| Integration and Test | C/BA | Wallops Island : Wallops Island, VA | 0.247 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.247 | - |
| Integration and Test | WR | NAWC AD : Pax River, MD | 0.250 | 0.000 | | 0.483 | Nov 2018 | 0.354 | Dec 2019 | - | | 0.354 | 0.000 | 1.087 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration and Test | WR | NAWC CHINA LAKE : China Lake, CA | 0.000 | 0.000 | | 1.340 | Dec 2018 | 1.340 | Dec 2019 | - | | 1.340 | 0.000 | 2.680 | - |
| Integration and Test | WR | NAWC Pax River : Pax River, MD | 0.000 | 0.000 | | 1.165 | Dec 2018 | 1.165 | Dec 2019 | - | | 1.165 | 0.000 | 2.330 | - |
| Integration and Test | C/CPFF | Lockheed Martin - Moorestown, NJ : Moorestown, NJ | 22.123 | 1.240 | Dec 2017 | 3.784 | Dec 2018 | 2.960 | Dec 2019 | - | | 2.960 | Continuing | Continuing | Continuing |
| Integration and Test | WR | PT MUGU : PT Mugu, CA | 6.809 | 0.750 | Oct 2017 | 1.034 | Oct 2018 | 1.034 | Dec 2019 | - | | 1.034 | 0.000 | 9.627 | - |
| Integration and Test | Various | Various : Various | 39.836 | 4.908 | Dec 2017 | 2.556 | Dec 2018 | 2.458 | Oct 2019 | - | | 2.458 | Continuing | Continuing | Continuing |
| Integration and Test | MIPR | Dept of Interior : Boise, ID | 2.340 | 0.238 | Dec 2017 | 1.031 | Dec 2018 | 1.031 | Dec 2019 | - | | 1.031 | 0.000 | 4.640 | - |
| Integration and Test | WR | NSWC/PHD : Port Hueneme, CA | 3.123 | 0.000 | | 0.212 | Dec 2018 | 0.250 | Oct 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 82.226 | 7.367 | | 12.034 | | 10.917 | | - | | 10.917 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project Planning and Management | WR | NAWC China Lake : China Lake, CA | 0.000 | 0.000 | | 0.201 | Dec 2018 | 0.201 | Dec 2019 | - | | 0.201 | 0.000 | 0.402 | - |
| Project Planning and Management | WR | NAWC Pax River : Pax River, MD | 0.000 | 0.000 | | 0.260 | Dec 2018 | 0.260 | Dec 2019 | - | | 0.260 | 0.000 | 0.520 | - |
| Project Planning and Management | C/CPFF | Various : Various | 19.517 | 0.840 | Dec 2017 | 0.542 | Dec 2018 | 0.404 | Dec 2019 | - | | 0.404 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 19.517 | 0.840 | | 1.003 | | 0.865 | | - | | 0.865 | Continuing | Continuing | N/A |

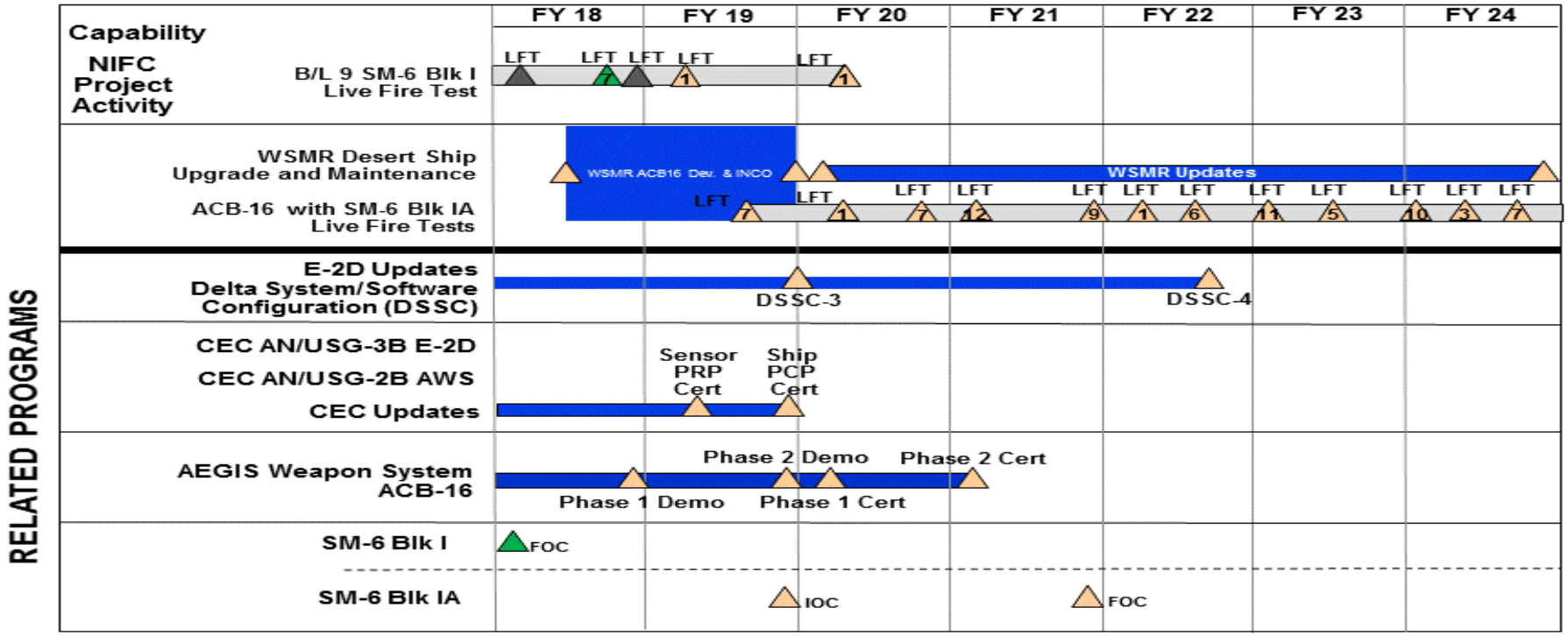
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 214.445 | 24.801 | | 33.429 | | 24.379 | | - | | 24.379 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* |

# NIFC
## FTS Planning Schedule



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3159*** | | | | |
| NIFC PROJECT ACTIVITY: B/L 9 SM-6 Blk I Live Fire Test (Rescheduled from 1Q18 to 4Q18) Completed | 4 | 2018 | 4 | 2018 |
| NIFC PROJECT ACTIVITY: B/L 9 SM-6 Blk I Live Fire Test 2/18 (Rescheduled to 2QFY19) | 2 | 2019 | 2 | 2019 |
| NIFC PROJECT ACTIVITY: B/L 9 SM-6 Blk I Live Fire Test 1/19 (Rescheduled from 4Q 2018) | 1 | 2019 | 1 | 2019 |
| NIFC PROJECT ACTIVITY: B/L 9 SM-6 Blk I Live Fire Test 1/20 | 1 | 2020 | 1 | 2020 |
| White Sands Missile Range (WSMR): WSMR Desert Ship Upgrade and Maintenance Development; WSMR ACB-16 Development and Installation and Check Out | 2 | 2018 | 4 | 2019 |
| White Sands Missile Range (WSMR): WSMR Desert Ship Upgrade and Maintenance Development; WSMR ACB-16 Updates | 1 | 2020 | 4 | 2024 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 1/19 | 1 | 2019 | 1 | 2019 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 1/20 | 2 | 2020 | 2 | 2020 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 2/20 | 4 | 2020 | 4 | 2020 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 1/21 | 1 | 2021 | 1 | 2021 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 2/21 | 4 | 2021 | 4 | 2021 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 1/22 | 2 | 2022 | 2 | 2022 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 1/23 | 1 | 2023 | 1 | 2023 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 2/23 | 3 | 2023 | 3 | 2023 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 1/24 | 1 | 2024 | 1 | 2024 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 2/24 | 2 | 2024 | 2 | 2024 |
| ACB 16 With SM-6Blk 1A Live Fire Tests: ACB-16 with SM-6 Blk IA Live Fire Test 3/24 | 3 | 2024 | 3 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3159 / *Naval Integrated Fire Control-Counter Air SE&I* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| E-2D Updates Delta System/Software Configuration (DSSC): E-2D UPDATES DELTA SYSTEM SOFTWARE CONFIGURATION (DSSC-3) | 4 | 2019 | 4 | 2019 |
| E-2D Updates Delta System/Software Configuration (DSSC): E-2D UPDATES DELTA SYSTEM SOFTWARE CONFIGURATION (DSSC-4) | 3 | 2022 | 3 | 2022 |
| CEC Updates: CEC Updates: Sensor PCP Certification | 2 | 2019 | 2 | 2019 |
| CEC Updates: CEC Updates: Ship PCP Certification | 4 | 2019 | 4 | 2019 |
| Aegis Weapon System ACB 16: Aegis Weapon System ACB-16: Phase 1 Demonstration | 4 | 2018 | 4 | 2018 |
| Aegis Weapon System ACB 16: Aegis Weapon System ACB-16: Phase 2 Demonstration | 4 | 2019 | 4 | 2019 |
| Aegis Weapon System ACB 16: Aegis Weapon System ACB-16: Phase 2 Certification | 1 | 2021 | 1 | 2021 |
| SM-6 Blk 1 & SM-6 Blk 1A: SM-6 Blk I: FOC | 1 | 2018 | 1 | 2018 |
| SM-6 Blk 1 & SM-6 Blk 1A: SM-6 Blk IA: IOC | 4 | 2019 | 4 | 2019 |
| SM-6 Blk 1 & SM-6 Blk 1A: SM-6 Blk IA: FOC | 4 | 2021 | 4 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3242 / *NIFC-CA Supported by Airborne Platforms* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3242: *NIFC-CA Supported by Airborne Platforms* | 0.000 | 0.000 | 0.000 | 9.000 | - | 9.000 | 9.000 | 9.000 | 9.000 | 9.180 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

This is not a new start effort. Naval Integrated Fire Control (NIFC) From the Air (FTA) Systems Engineering Integration and Test (SEI&T) efforts are part of Project Unit 3159 (Naval Integrated Fire Control-Counter Air SE&I) in FY 2019 but move to Project 3242 starting in FY 2020.

**A. Mission Description and Budget Item Justification**

Naval Integrated Fire Control (NIFC) From the Air (FTA) Systems Engineering Integration and Test (SEI&T) project is a systems engineering effort to integrate NIFC FTA capabilities within "Pillar Programs" (F/A-18 & EA-18G, E-2D, F-35, Link-16 and Tactical Targeting Network Technology Data Links, and AIM-120 and AIM-9X weapons). Based on the advancing threat, there remains an imperative to improve lethality, survivability and interoperability by extending the battlespace out to the maximum kinematic range of our weapons for the air, surface, and strike warfare missions. The NIFC FTA project leverages capabilities inherent in existing systems, optimizes current and emerging technologies in platform system upgrades, and integrates them together to form interoperable System of Systems (SoS) to maximize offensive and defensive FTA integrated capabilities. As directed from OPNAV, the project is focused on development of Air Warfare, Surface Warfare, and Strike Warfare FTA effects chains. This PU will support efforts that include decomposing SoS requirements into Mission Technical Baselines (MTBs) and Integrated Capability Technical Baselines (ICTBs) for requirement allocation to Pillar Programs. Additionally, this PU will support NIFC pillar program coordination to provide performance predictions, performance assessments, and SoS risk reduction activities through Live, Virtual, and Constructive (LVC) events, SoS exercises, and development of Requirements Test and Verification Matrices (RTVMs) to support Developmental and Operational Test for the individual platforms. In lieu of a traditional Test and Evaluation Master Plan (TEMP), NIFC FTA test strategies will be developed to identify resources required to evaluate NIFC FTA capabilities, and describe how NIFC FTA capabilities will be evaluated prior to fleet delivery.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** NIFC From the Air (FTA) Capabilities Effectiveness and Integration | 0.000 | 0.000 | 9.000 | 0.000 | 9.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develops and executes multi-platform cross-domain offensive and defensive kinematic and non-kinematic effects chains as directed by OPNAV. | | | | | |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3242 / *NIFC-CA Supported by Airborne Platforms* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| NIFC FTA System of Systems (SoS) verification and validation test are planned throughout the year, including evaluation of integrated F/A-18E/F and EA-18G H16, E-2D DSSC-4 capabilities, and air/surface launched cruise missiles. Tactical Targeting Network Technology (TTNT) and other planned system upgraded capabilities will be introduced into SoS integrated effects chains. Continue maturing Federation lab upgrades to support SoS engineering & test. Continuation of V&V of Live Virtual Constructive (LVC) functional capabilities. NIFC Increment 3.X requirements definition, engineering product development, and risk reduction will continue to occur throughout the year.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 increase due to realignment of funds from Project 3159 for Airborne Platforms starting in FY20. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 9.000 | 0.000 | 9.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not Applicable.

**E. Performance Metrics**

FTA pillar platform (F/A-18, E-2D, etc) test programs and analysis will provide data to verify NIFC performance with respect to NIFC Measures of Effectiveness (MOEs), Measures of Performance (MOPs), and NIFC requirements within the Pillar Programs. Data will be used to update the expected performance of NIFC FTA, as required, and provide feedback to Pillar programs.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3242 / *NIFC-CA Supported by Airborne Platforms* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYSTEM ENGINEERING | WR | NAWC AD : PAX RIVER, MD | 0.000 | 0.000 | | 0.000 | | 3.295 | Oct 2019 | - | | 3.295 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | NAWC CHINA LAKE : CHINA LAKE, CA | 0.000 | 0.000 | | 0.000 | | 2.739 | Oct 2019 | - | | 2.739 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 6.034 | | - | | 6.034 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INTEGRATION AND TEST | WR | NAWC AD : PAX RIVER, MD | 0.000 | 0.000 | | 0.000 | | 1.165 | Oct 2019 | - | | 1.165 | Continuing | Continuing | Continuing |
| INTEGRATION AND TEST | WR | NAWC CHINA LAKE : CHINA LAKE, CA | 0.000 | 0.000 | | 0.000 | | 1.340 | Oct 2019 | - | | 1.340 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.505 | | - | | 2.505 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PROJECT PLANNING AND MANAGEMENT | WR | NAWC AD : PAX RIVER, MD | 0.000 | 0.000 | | 0.000 | | 0.260 | Oct 2019 | - | | 0.260 | Continuing | Continuing | Continuing |
| PROJECT PLANNING AND MANAGEMENT | WR | NAWC CHINA LAKE : CHINA LAKE, CA | 0.000 | 0.000 | | 0.000 | | 0.201 | Oct 2019 | - | | 0.201 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.461 | | - | | 0.461 | Continuing | Continuing | N/A |

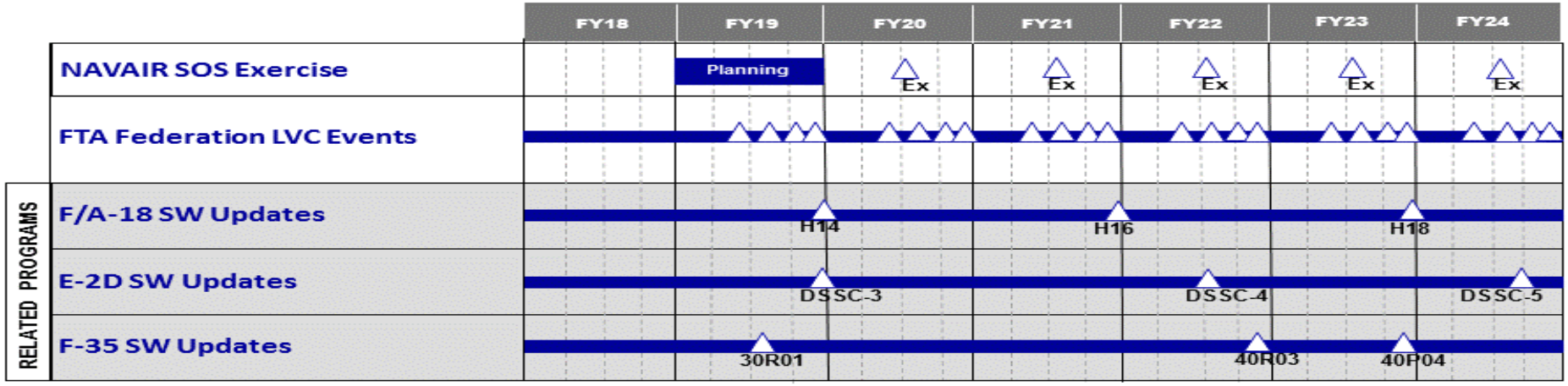
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | Project (Number/Name)<br>3242 / *NIFC-CA Supported by Airborne Platforms* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 9.000 | | - | | 9.000 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3242 / *NIFC-CA Supported by Airborne Platforms* |

# NIFC
## FTA Planning Schedule



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3242 / *NIFC-CA Supported by Airborne Platforms* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3242*** | | | | |
| NAVAIR SoS Excercise 3/20 | 3 | 2020 | 3 | 2020 |
| NAVAIR SoS Excercise 3/21 | 3 | 2021 | 3 | 2021 |
| NAVAIR SoS Excercise 3/22 | 3 | 2022 | 3 | 2022 |
| NAVAIR SoS Excercise 3/23 | 3 | 2023 | 3 | 2023 |
| NAVAIR SoS Excercise 3/24 | 3 | 2024 | 3 | 2024 |
| FTA Federation LVC Event 1 | 2 | 2019 | 2 | 2019 |
| FTA Federation LVC Event 2 | 3 | 2019 | 3 | 2019 |
| FTA Federation LVC Event 3 | 4 | 2019 | 4 | 2019 |
| FTA Federation LVC Event 4 | 4 | 2019 | 4 | 2019 |
| FTA Federation LVC Event 5 | 2 | 2020 | 2 | 2020 |
| FTA Federation LVC Event 6 | 3 | 2020 | 3 | 2020 |
| FTA Federation LVC Event 7 | 4 | 2020 | 4 | 2020 |
| FTA Federation LVC Event 8 | 4 | 2020 | 4 | 2020 |
| FTA Federation LVC Event 9 | 2 | 2021 | 2 | 2021 |
| FTA Federation LVC Event 10 | 3 | 2021 | 3 | 2021 |
| FTA Federation LVC Event 11 | 4 | 2021 | 4 | 2021 |
| FTA Federation LVC Event 12 | 4 | 2021 | 4 | 2021 |
| FTA Federation LVC Event 13 | 2 | 2022 | 2 | 2022 |
| FTA Federation LVC Event 14 | 3 | 2022 | 3 | 2022 |
| FTA Federation LVC Event 15 | 4 | 2022 | 4 | 2022 |
| FTA Federation LVC Event 16 | 4 | 2022 | 4 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604378N / *Nav Integrated Fire Control-Counter Air Sys Eng* | **Project (Number/Name)**<br>3242 / *NIFC-CA Supported by Airborne Platforms* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| FTA Federation LVC Event 17 | 2 | 2023 | 2 | 2023 |
| FTA Federation LVC Event 18 | 3 | 2023 | 3 | 2023 |
| FTA Federation LVC Event 19 | 4 | 2023 | 4 | 2023 |
| FTA Federation LVC Event 20 | 4 | 2023 | 4 | 2023 |
| FTA Federation LVC Event 21 | 2 | 2024 | 2 | 2024 |
| FTA Federation LVC Event 22 | 3 | 2024 | 3 | 2024 |
| FTA Federation LVC Event 23 | 4 | 2024 | 4 | 2024 |
| FTA Federation LVC Event 24 | 4 | 2024 | 4 | 2024 |
| F/A -18 SW Updates (H14) | 4 | 2019 | 4 | 2019 |
| F/A -18 SW Updates (H16) | 4 | 2021 | 4 | 2021 |
| F/A -18 SW Updates (H18) | 4 | 2023 | 4 | 2023 |
| E-2D SW Updates DSSC 3 | 4 | 2019 | 4 | 2019 |
| E-2D SW Updates DSSC 4 | 3 | 2022 | 3 | 2022 |
| E-2D SW Updates DSSC 5 | 3 | 2024 | 3 | 2024 |
| F-35 SW Updates 30R01 | 3 | 2019 | 3 | 2019 |
| F-35 SW Updates 40R03 | 4 | 2022 | 4 | 2022 |
| F-35 SW Updates 40P04 | 4 | 2023 | 1 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604501N *I Advanced Above Water Sensors* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 363.843 | 84.507 | 33.884 | 34.554 | - | 34.554 | 23.693 | 15.660 | 14.932 | 15.232 | Continuing | Continuing |
| 3188: *Dual-Band Radar* | 105.588 | 7.151 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 112.739 |
| 3232: *Multi-Mission Signal Processor* | 158.547 | 2.378 | 2.464 | 2.005 | - | 2.005 | 2.987 | 3.056 | 3.114 | 3.176 | Continuing | Continuing |
| 3236: *Advanced Radar Technology* | 74.317 | 64.690 | 23.552 | 1.933 | - | 1.933 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 164.492 |
| 3301: *Improved Capabilities SPY-1 Radar* | 25.391 | 10.288 | 7.868 | 13.116 | - | 13.116 | 12.606 | 11.604 | 11.818 | 12.056 | Continuing | Continuing |
| 3408: *AN/SPS-49 Technical Refresh* | 0.000 | 0.000 | 0.000 | 17.500 | - | 17.500 | 8.100 | 1.000 | 0.000 | 0.000 | 0.000 | 26.600 |

**A. Mission Description and Budget Item Justification**

Dual-Band Radar (DBR) Upgrades: Funding is for Dual Band Radar (DBR) System upgrades to implement cost savings initiatives for Volume Search Radar (VSR) modifications, supportability analysis and associated logistics product updates; future upgrades/technology insertion efforts for Multi-Function Radar (MFR)/VSR as a part of the DBR suite on CVN 78 Class ships and the MFR on DDG 1000 Class ships. Funding is also required to resolve the hardware and software issues discovered during the various test events to include: DTB2-411, SDTS testing, Land Based Testing and pertinent At-Sea test events. The upgrades will include all aspects of the radar system/subsystems, including hardware and software. Specific subsystem areas include the Array, Transmit/Receive (T/R) module, Receiver/Exciter, Signal Data Processor, Radome, and power/cooling systems. Upgrades and technology insertions are required to maintain the level of force protection needed for ship defense against all threats envisioned in the littoral environment. The supportability analysis and logistic products associated with these upgrades will also be developed and updated. DBR CVN 78 Testing and Certification: FY18 requirement supported DBR At-Sea Test and Evaluation (T&E), Environmental Testing DBR Systems Certification for CVN 78 and CVN 78 Waterfront Integration Testing (WIT). The WIT efforts integrate and test the radar with the CVN78 combat system prior to the Self Defense Test Ship (SDTS) risk reduction firings (ET-09) in late FY18. Conducting the WIT allows for early identification of radar issues to ensure the Integrated Combat System (ICS) can meet all objectives to reduce any potential risk to ET-09. FY2018 is the final year of RDT&E funding planned for this program.

Multi-Mission Signal Processor (MMSP): The development of MMSP provides simultaneous Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) multi-mission capability for DDG 51 class ships as part of the Aegis Modernization Program. This capability is utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1D transmitters
to enable dual beam for reduced frame times and better reaction time, provides stability for all D(V) waveforms, and avoids operational degradation. The SPY-1 radar system detects, tracks, and supports engagements of a broader range of threats. MMSP improves performance in littoral, ducted clutter, electronic attack (EA), and chaff environments and provides greater commonality in computer programs and equipment. This effort also provides for the development of MMSP on Destroyers Commercial Off The Shelf (COTS) refresh and MMSP technology refresh. MMSP/AEGIS Linear Processing System (ALPS) integration provides adjunct processing for data collection.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604501N *I Advanced Above Water Sensors* |

MMSP development includes the commencement of technology refresh to support Aegis Modernization due to Diminishing Manufacturing Sources and Material Shortages (DMSMS) and obsolescence issues. MMSP technology refresh, including MMSP-Refresh (MMSP-R), began in FY16. MMSP-R includes software updates required on new computer platforms.
Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include system security requirements. In FY20, MMSP/ALPS research, development, and integration will provide cost effective radar system-level improvements.

Advanced Radar Technology (ART): Enterprise Air Surveillance Radar (EASR) will modify an existing radar technology to meet the air surveillance requirements for multiple ship classes. EASR will be one sensor in a suite that is designed to meet the performance needs for ship self-defense, situational awareness and air traffic control. EASR will replace the Volume Search Radar (VSR) in the CVN 78 Class Dual Band Radar system and the AN/SPS-48/49 radar systems in numerous ship classes. The AN/SPS-48 Radars are long-range, three-dimensional (3-D) radars used to search, detect and provide space-stabilized, three-coordinate (range, bearing, height) data for air intercept control and designation to a weapon system. The AN/SPS-49A(V)1 radar system is a long range, two dimensional (2-D), L-Band air surveillance radar installed on USN major combatants. The AN/SPY-4 Volume Search Radar (VSR) is an S-Band active phased array radar deployed on CVN 78 providing volume surveillance and air traffic control. EASR funding will develop a modern 3-D air search radar that addresses the latest requirements for Aviation and Amphibious Warfare Ships and closely conforms to existing combat system interfaces, as well as aligns with existing shipboard space, weight, and power limits. The architecture and acquisition strategy for EASR is intended to drive a lower recurring cost by utilizing the same core technology for both fixed-face and rotating array variants. EASR will provide for engineering of component and system level technology improvements for equipment used by in-service air search radars.

Improved Capabilities for SPY-1 Radar: These Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions are intended to reduce cascading failures, mitigate obsolescence issues, and improve reliability in support of Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) missions while still providing AN/
SPY-1 Radar Total Ownership Cost Reductions. Improvements, such as Solid State Insertion to address Diminishing Manufacturing Sources and Material Shortages (DMSMS), will yield reductions in annual fleet maintenance costs and is a top fleet requirement as part of the AEGIS Wholeness initiative. In addition to RM&A improvements, warfighting improvements funded in this line include: Transmitter Noise Cancellation (TNC) development will include hardware/software to counter low radar cross section, low altitude threats. Side Lobe Blanking (SLB) addresses shortfalls in mixed electronic attack environment while in an Integrated Air and Missile Defense (IAMD) mode. The Ship-Based Non-Cooperative Target Recognition (SBNCTR) program Phases 2, 2A and 3 will develop algorithms to provide classification for targets. Transition of Advanced Calibration Experiment (ACE) Phases 1 and 2 from Baseline 7 into Baseline 9. Incorporate ERACE Phases 1/2 and 3 into Baseline 9. Electronic Attack (EA) and Rapid Radar Capability Improvement Program (R2CIP) develop solutions for evolving EA threats. FY20 includes completion of ACE Phase 1, continuation of development of ACE Phase 2, SBNCTR Phase 2A, TNC, EA improvements, and Elevated Radar Advanced Calibration Experiment (ERACE) Phase 1/2. Due to reduced SBNCTR funding in FY19, efforts have been deferred to FY20. ERACE certification is targeted to be part of Baseline 9.2.X certification, which is scheduled for 2Q FY22.

AN/SPS-49 Technology Refresh: As the only Air Surveillance Radar on the LSD 41/49 class ships, continued degradation and increasingly low radar availability of the AN/SPS-49 Radar is greatly impacting deployed missions, impacting safety of flight and affecting LSD Air Warfare capability and operations. Funding is to complete development, test and evaluation, validation and integration of a technology refresh of the below deck hardware for the AN/SPS-49A(V)1 Long Range Air Surveillance

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604501N *I Advanced Above Water Sensors* |

Radar. This technology refresh will include Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions which will reduce cascading failures and mitigate obsolescence issues. In addition, this effort replaces key components to include: transmitter, receiver, exciter, antenna elevation servo control, radar system control, display and signal data processor (SDP). A digital receiver/exciter (DREX) with high-performance computing technology will be a key component in the new system. The current SPS-49 radar has no software so new software is being developed to mimic the current radar functions to maintain compatibility with internal and external interfaces. This effort will improve SPS-49 electronic protection, have increased surveillance range and increased slow moving small target detection, as well as reduce total ownership cost with lower unit cost and smaller size/weight/power requirements. Funding will also be used to address potential hardware and software issues discovered during land based test events and integration with the Ship Self Defense System (SSDS).

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 87.233 | 35.635 | 17.393 | - | 17.393 |
| Current President's Budget | 84.507 | 33.884 | 34.554 | - | 34.554 |
| Total Adjustments | -2.726 | -1.751 | 17.161 | - | 17.161 |
| • Congressional General Reductions | - | -0.046 | | | |
| • Congressional Directed Reductions | - | -1.705 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -2.687 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 17.218 | - | 17.218 |
| • Rate/Misc Adjustments | -0.001 | 0.000 | -0.057 | - | -0.057 |
| • Congressional General Reductions Adjustments | -0.038 | - | - | - | - |

**Change Summary Explanation**

FY 2018 decrease is due to Small Business Innovation Research (SBIR), Navy Working Capital Fund and Federally Funded Research and Development Center (FFRDC) reductions.

FY 2019 decrease is due to adjustment to the Enterprise Air Surveillance Radar (EASR) program and FFRDC reduction.

FY 2020 increase (+$17.500M) is due to initiation of AN/SPS-49 below deck technology refresh effort and various rate adjustments. FY 2020 also includes a $0.282M Contractor Services Reform reduction.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3188 / *Dual-Band Radar* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3188: *Dual-Band Radar* | 105.588 | 7.151 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 112.739 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Dual-Band Radar (DBR) Upgrades: Funding is for Dual Band Radar (DBR) System upgrades to implement cost savings initiatives for Volume Search Radar (VSR) modifications, supportability analysis and associated logistics product updates; future upgrades/technology insertion efforts for Multi-Function Radar (MFR)/VSR as a part of the DBR suite on CVN 78 Class ships and the MFR on DDG 1000 Class ships. Funding is also required to resolve the hardware and software issues discovered during the various test events to include: DTB2-411, SDTS testing, Land Based Testing and pertinent At-Sea test events. The upgrades will include all aspects of the radar system/subsystems, including hardware and software. Specific subsystem areas include the Array, Transmit/Receive (T/R) module, Receiver/Exciter, Signal Data Processor, Radome, and power/cooling systems. Upgrades and technology insertions are required to maintain the level of force protection needed for ship defense against all threats envisioned in the littoral environment. The supportability analysis and logistic products associated with these upgrades will also be developed and updated. DBR CVN 78 Testing and Certification: FY18 requirement supported DBR At-Sea Test and Evaluation (T&E), Environmental Testing DBR Systems Certification for CVN 78 and CVN78 Waterfront Integration Testing (WIT). The WIT efforts integrate and test the radar with the CVN78 combat system prior to the Self Defense Test Ship (SDTS) risk reduction firings (ET-09) scheduled for late FY18. Conducting the WIT allows for early identification of radar issues to ensure the Integrated Combat System (ICS) can meet all objectives to reduce any potential risk to ET-09. FY2018 is the final year of RDT&E funding planned for this program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** RADAR UPGRADES TECHNOLOGY INSERTION | 5.031 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** RADAR UPGRADES GOVERNMENT ENGINEERING SERVICES | 2.024 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3188 / *Dual-Band Radar* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** RADAR UPGRADES PROGRAM MANAGEMENT | 0.096 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.151 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2980: *BLI 2980/ OPN Items Less Than $5M* | 16.350 | 35.811 | 21.898 | - | 21.898 | 24.271 | 21.903 | 17.817 | 21.670 | Continuing | Continuing |
| • O&M,N/1C1C/0702228N: *0702228N/1C1C/O&M,N* | 2.851 | 9.704 | 9.210 | - | 9.210 | 9.385 | 9.554 | 9.588 | 9.779 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Radar Upgrades and logistic products will be developed to address lessons learned and technology refresh for DBR systems on multiple ship classes.

**E. Performance Metrics**

- Complete upgrade studies and analyses each fiscal year to determine efficiencies for Hardware (H/W) and Software (S/W) upgrades and to determine appropriate logistics product updates

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3188 / *Dual-Band Radar* |

- Complete Electromagnetic Interference (EMI) Testing and Analysis
- Complete upgrade technology insertion
- Complete development of logistics products
- Implement supportability analysis to improve supportability and reduce overall lifecycle cost
- Complete DBR At-Sea Test and Evaluation (T&E)
- Complete planning for DBR Environmental Testing
- Complete DBR Systems Certification
- Complete DBR/SEWIP interface development
- Complete DBR Shipboard Testing
- Complete FY2018 CVN 78 Waterfront Integration Testing

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3188 / *Dual-Band Radar* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | Other Government Activities : Various | 1.143 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.143 | - |
| Government Engineering Support | WR | NSWC/Dahlgren : Dahlgren, VA | 16.112 | 0.958 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.070 | - |
| Government Engineering Support | WR | NSWC/PHD : Port Hueneme, CA | 6.796 | 0.249 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.045 | - |
| Government Engineering Support | WR | NSWC/Crane : Crane, IN | 5.281 | 0.020 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.301 | - |
| Government Engineering Support | WR | NRL : Washington, DC | 3.725 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.725 | - |
| Government Engineering Support | SS/CPFF | JHU/APL : Columbia, MD | 2.092 | 0.605 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.697 | - |
| Government Engineering Support | MIPR | NSMA : Arlington, VA | 0.903 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.903 | - |
| Government Engineering Support | SS/CPFF | GTRI : Atlanta, GA | 1.158 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.158 | - |
| Government Engineering Support | WR | NSWC/Carderock : Philadelphia, PA | 0.364 | 0.076 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.440 | - |
| Government Engineering Support | WR | NSWC/Dam Neck : Dam Neck, VA | 1.274 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.274 | - |
| Government Engineering Support | SS/CPFF | AEGIS Tech Rep : Moorestown, NJ | 0.014 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.014 | - |
| Government Engineering Support | WR | TASC : Andover, MA | 0.048 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.048 | - |
| Government Engineering Support | WR | NSWC/Corona : Corona, CA | 0.714 | 0.116 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.830 | - |
| Government Engineering Support | WR | NAWC/PT MUGU : PT MUGU, CA | 0.586 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.586 | - |
| Systems Engineering | SS/CPFF | Raytheon : Raytheon, Sudbury, MA | 56.686 | 5.031 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 61.717 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3188 / *Dual-Band Radar* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | SS/CPAF | Raytheon IDS : San Diego, CA | 1.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.500 | - |
| Systems Engineering | SS/CPFF | General Dynamics AIS : Fairfax, VA | 1.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.000 | - |
| Systems Engineering | SS/CPFF | PMS 320 Syntek : Arlington, VA | 0.400 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| | | **Subtotal** | 99.796 | 7.055 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 106.851 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPIF | SPA (SEAPORT) : Washington, DC | 4.719 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.719 | - |
| DAWDF | Allot | N/A : N/A | 0.027 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.027 | - |
| Travel | Allot | PEOIWS2 : Washington, DC | 0.200 | 0.030 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.230 | - |
| Program Management Support | C/CPIF | ALION : Washington, DC | 0.026 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.026 | - |
| Program Management Support | C/CPFF | CACI : Washington, DC | 0.316 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.316 | - |
| Program Management Support | C/CPIF | TMB : Washington, DC | 0.047 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.047 | - |
| Program Management Support | C/CPIF | SPA : Washington, DC | 0.195 | 0.066 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.261 | - |
| Program Management Support | SS/CPIF | SPA (Bridge) : Washington, DC | 0.262 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.262 | - |
| | | **Subtotal** | 5.792 | 0.096 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.888 | N/A |

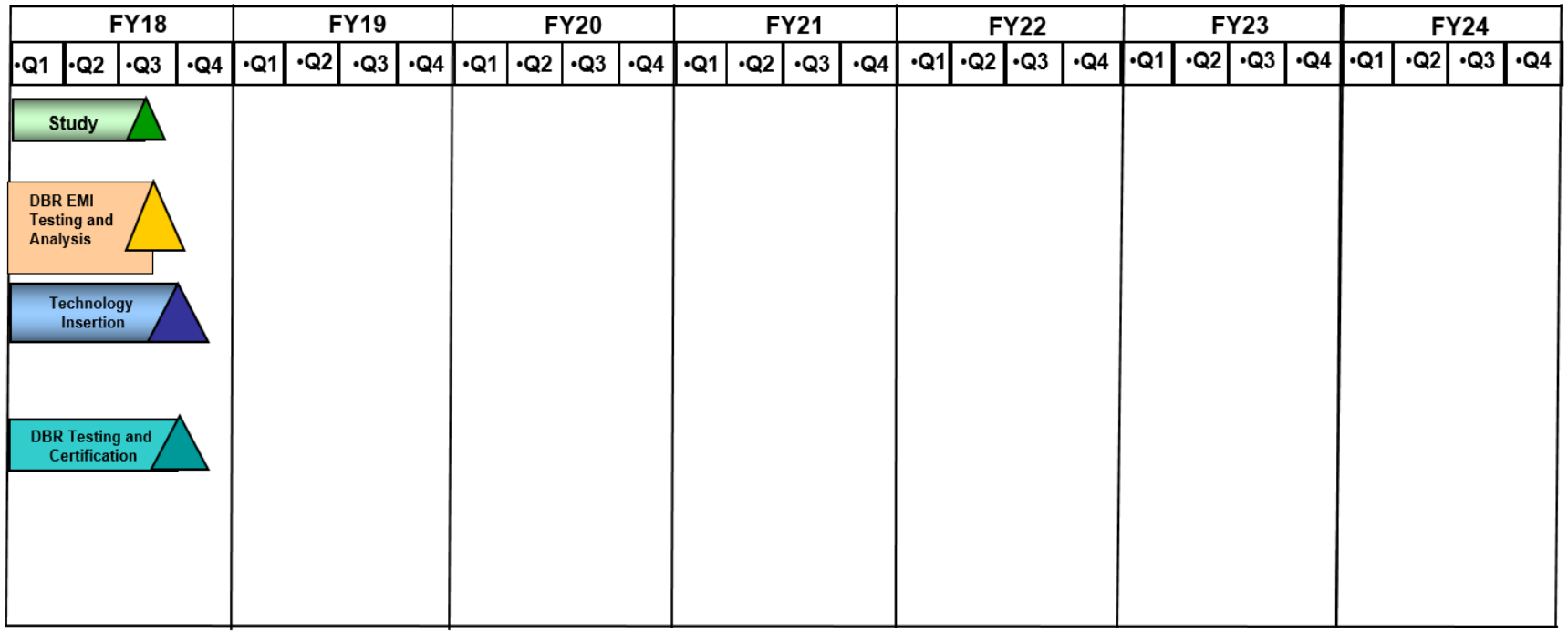
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3188 / *Dual-Band Radar* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 105.588 | 7.151 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 112.739 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3188 / *Dual-Band Radar* |

**DBR System Upgrades**




Note: Supportability Analysis is conducted in conjunction with the Study.

DBR At-Sea T&E, Planning for Environmental Testing, DBR System Certification, and CVN 78 DBR Waterfront Integration Testing are included in the DBR Testing and Certification Support

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3188 / *Dual-Band Radar* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3188*** | | | | |
| DBR System Upgrade Studies and Analysis | 1 | 2018 | 3 | 2018 |
| DBR EMI Testing and Analysis | 1 | 2018 | 3 | 2018 |
| DBR System Upgrade Technology Insertion | 1 | 2018 | 4 | 2018 |
| DBR Testing and Certification | 1 | 2018 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3232 / *Multi-Mission Signal Processor* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3232: *Multi-Mission Signal Processor* | 158.547 | 2.378 | 2.464 | 2.005 | - | 2.005 | 2.987 | 3.056 | 3.114 | 3.176 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Multi-Mission Signal Processor (MMSP): The development of MMSP provides simultaneous Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) multi-mission capability for
DDG 51 class ships as part of the Aegis Modernization Program. This capability is utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1D transmitters
to enable dual beam for reduced frame times and better reaction time, provides stability for all D(V) waveforms, and avoids operational degradation. The SPY-1 radar system detects,
tracks, and supports engagements of a broader range of threats. MMSP improves performance in littoral, ducted clutter, electronic attack (EA), and chaff environments and provides
greater commonality in computer programs and equipment. This effort also provides for the development of MMSP on Destroyers Commercial Off The Shelf (COTS) refresh and
MMSP technology refresh. MMSP/AEGIS Linear Processing System (ALPS) integration provides adjunct processing for data collection.

MMSP development includes the commencement of technology refresh to support Aegis Modernization due to Diminishing Manufacturing Sources and Material Shortages (DMSMS) and obsolescence issues. MMSP technology refresh, including MMSP-Refresh (MMSP-R), began in FY16. MMSP-R includes software updates required on new computer platforms.
Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include system security requirements. In FY20, MMSP/ALPS research, development, and integration will provide cost effective radar system-level improvements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SYSTEMS ENGINEERING | 2.378 | 2.464 | 2.005 | 0.000 | 2.005 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue MMSP-R development to support AEGIS Modernization due to DMSMS and obsolescence issues.<br>- Complete MMSP-R ACB16 integration and test.<br>- Conduct MMSP-R ACB16 Multi-Mission Exercise (MMEX).<br>- Conduct MMSP-R Demo. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3232 / *Multi-Mission Signal Processor* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue to maintain alignment with the Ballistic Missile Defense (BMD) Program and the associated Ballistic Missile Defense Signal Processor (BSP) adjunct to incorporate BMD capability within MMSP during AEGIS Modernization.<br>- Continue to support ACB16 MMSP improvements.<br>***FY 2020 Base Plans:***<br>- Continue MMSP-R development to support AEGIS Modernization due to DMSMS and obsolescence issues.<br>- Continue to maintain alignment with the BMD Program and the associated BSP adjunct to incorporate BMD capability within MMSP during AEGIS Modernization.<br>- Continue to support ACB16 MMSP improvements.<br>- Complete MMSP-R ECPs.<br>- Perform MMSP/ALPS concept development.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease in FY2020 is due to completion of MMSP-R ACB16 integration and test. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.378 | 2.464 | 2.005 | 0.000 | 2.005 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/0900: *BLI 0900/ OPN DDG Modernization* | 592.644 | 462.908 | 551.140 | - | 551.140 | 555.525 | 812.338 | 1,042.482 | 1,107.075 | 2,558.665 | 10,373.593 |

**Remarks**

**D. Acquisition Strategy**

Multi-Mission Signal Processor (MMSP) provides simultaneous AAW/BMD Multi-mission capability for AEGIS Modernization Program and leverages BMD 4.0.1 and SPY-1D(V) designs. This MMSP development efforts support integration of BMD 5.0 signal processing, and will lead to the OPN/SCN procurement for shore sites and shipsets. MMSP technology refresh will be incorporated into Baseline 9 and follow. MMSP/ALPS integration provides adjunct processing for data collection.

**E. Performance Metrics**

- Complete DDG Commercial Off The Shelf (COTS) Refresh - Engineering Change Proposal (ECP) for MMSP on Destroyers

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3232 / *Multi-Mission Signal Processor* |

- Complete ACB16 Phase 1 certification
- Complete ACB16 Phase 2 certification
- Complete ACB16 COTS Refresh
- Complete MMSP-R Design and Development
- Complete MMSP-R Radar integration and test
- Complete MMSP-R ACB16 integration and test
- Complete MMSP-R ACB16 MMEX
- Complete MMSP-R Demo
- Complete MMSP-R ECPs
- Complete MMSP/ALPS concept development
- Complete MMSP/ALPS requirements analysis and specifications update
- Complete MMSP/ALPS technology development

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3232 / *Multi-Mission Signal Processor* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYSTEM ENGINEERING | SS/CPFF | Lockheed Martin : Moorestown, NJ | 115.186 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | C/CPFF | AEGIS Techrep : Moorestown, NJ | 5.341 | 0.150 | Mar 2018 | 0.150 | Nov 2018 | 0.150 | Dec 2019 | - | | 0.150 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | SS/FP | APL/JHU : Laurel, MD | 4.911 | 0.120 | Aug 2018 | 0.080 | Feb 2019 | 0.075 | Nov 2019 | - | | 0.075 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | CSCS : Dahlgren, VA | 1.580 | 0.062 | Jun 2018 | 0.062 | Nov 2018 | 0.062 | Jun 2020 | - | | 0.062 | 0.000 | 1.766 | - |
| SYSTEM ENGINEERING | WR | NRL : Washington, DC | 3.058 | 0.106 | Nov 2017 | 0.132 | Dec 2018 | 0.126 | Nov 2019 | - | | 0.126 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | MIPR | MIT/LL : Lexington, MA | 1.453 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.453 | - |
| SYSTEM ENGINEERING | WR | NSWC/DD : Dahlgren, VA | 8.806 | 0.334 | Oct 2017 | 0.400 | Nov 2018 | 0.372 | Oct 2019 | - | | 0.372 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | SCSC : Wallops Island, VA | 0.019 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.019 | - |
| SYSTEM ENGINEERING | WR | NSWC/CR : Crane, IN | 4.147 | 1.388 | Oct 2017 | 1.369 | Nov 2018 | 0.960 | Oct 2019 | - | | 0.960 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | NSWC/PHD : Port Hueneme, CA | 4.149 | 0.121 | Nov 2017 | 0.172 | Nov 2018 | 0.161 | Oct 2019 | - | | 0.161 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | Office of Naval Research : Arlington, VA | 5.779 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.779 | - |
| | | **Subtotal** | 154.429 | 2.281 | | 2.365 | | 1.906 | | - | | 1.906 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | PEOIWS2 : Washington, DC | 0.238 | 0.010 | Nov 2017 | 0.010 | Jan 2019 | 0.010 | Oct 2019 | - | | 0.010 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3232 / *Multi-Mission Signal Processor* |

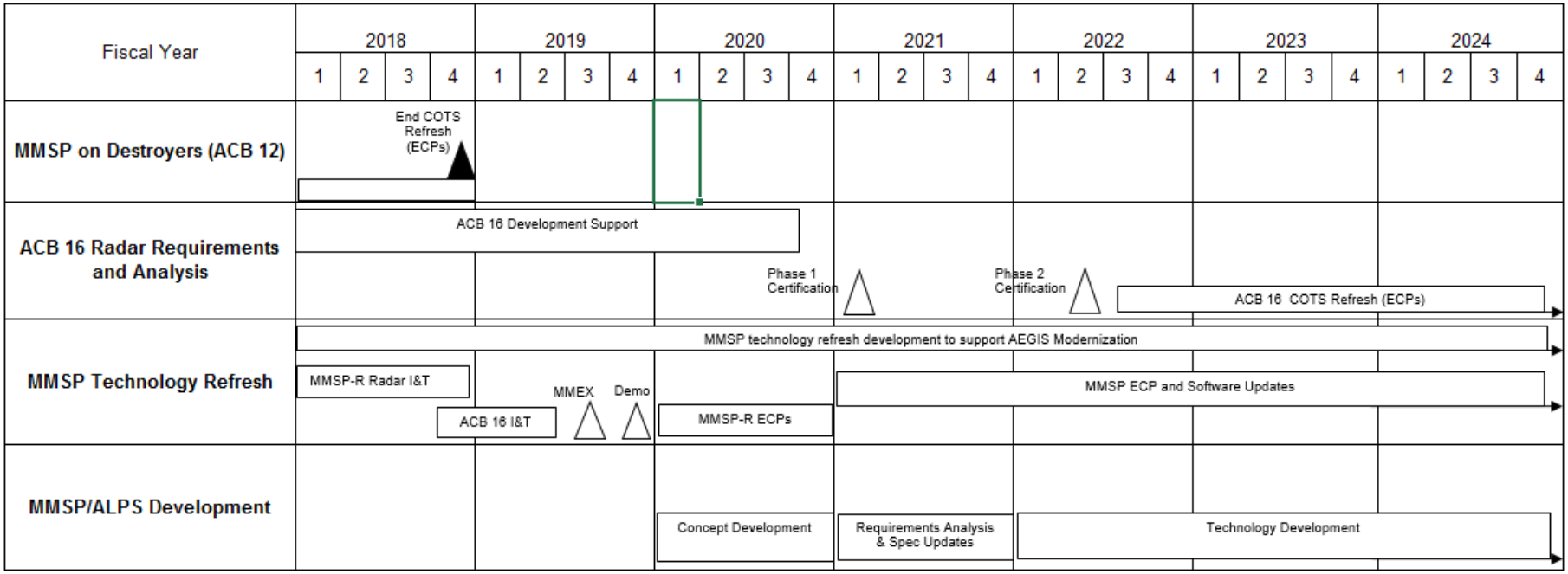
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Management Services | C/CPIF | SPA : Washington, DC | 0.078 | 0.087 | Jul 2018 | 0.089 | Dec 2018 | 0.089 | Nov 2019 | - | | 0.089 | Continuing | Continuing | Continuing |
| Support Management Services | SS/CPIF | SPA (Bridge) : Washington, DC | 1.403 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.403 | - |
| Support Management Services | C/CPIF | SPA (SEAPORT) : Washington, DC | 2.247 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.247 | - |
| Support Management Services | C/CPFF | CACI : Washington, DC | 0.094 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.094 | - |
| Support Management Services | C/CPFF | TMB : Washington, DC | 0.031 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.031 | - |
| Support Management Services | C/CPFF | Strategic Insight : Washington, DC | 0.027 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.027 | - |
| | | **Subtotal** | 4.118 | 0.097 | | 0.099 | | 0.099 | | - | | 0.099 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 158.547 | 2.378 | | 2.464 | | 2.005 | | - | | 2.005 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3232 / *Multi-Mission Signal Processor* |




ACB 16 COTS Refresh continues beyond the FYDP.
MMSP Technology Refresh continues beyond the FYDP.
MMSP/ALPS continues beyond the FYDP.
ACB16 Radar Requirements and Analysis schedule has been adjusted to align with the updated ACB16 Combat System schedule.

**Acronyms:**
ACB: AEGIS Capability Build
COTS: Commercial Off The Shelf
I&T: Integration & Test
ALPS: AEGIS Linear Processing System
ECP: Engineering Change Proposal
MMEX: Multi-Mission Exercise
MMSP-R: Multi-Mission Signal Processor Refresh

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3232 / *Multi-Mission Signal Processor* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3232*** | | | | |
| DDG Commercial Off The Shelf (COTS) Refresh - Engineering Change Proposals (ECP) | 1 | 2018 | 4 | 2018 |
| ACB16 Development Support | 1 | 2018 | 3 | 2020 |
| MMSP Technology Refresh to Support AEGIS Modernization | 1 | 2018 | 4 | 2024 |
| MMSP-R Radar Integration and Test | 1 | 2018 | 4 | 2018 |
| MMSP-R ACB16 Integration and Test | 4 | 2018 | 2 | 2019 |
| MMSP-R ACB16 Multi-Mission Exercise (MMEX) | 3 | 2019 | 3 | 2019 |
| MMSP-R Demo | 4 | 2019 | 4 | 2019 |
| MMSP-R ECPs | 1 | 2020 | 4 | 2020 |
| MMSP/ALPS Concept Development | 1 | 2020 | 4 | 2020 |
| ACB16 Phase 1 Certification | 1 | 2021 | 1 | 2021 |
| MMSP ECP and Software Updates | 1 | 2021 | 4 | 2024 |
| MMSP/ALPS Requirements Analysis and Specifications Update | 1 | 2021 | 4 | 2021 |
| MMSP/ALPS Technology Development | 1 | 2022 | 4 | 2024 |
| ACB16 Phase 2 Certification | 2 | 2022 | 2 | 2022 |
| ACB16 COTS Refresh (ECPs) | 3 | 2022 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3236 / *Advanced Radar Technology* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3236: *Advanced Radar Technology* | 74.317 | 64.690 | 23.552 | 1.933 | - | 1.933 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 164.492 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Advanced Radar Technology (ART): Enterprise Air Surveillance Radar (EASR) will modify an existing radar technology to meet the air surveillance requirements for multiple ship classes. EASR will be one sensor in a suite that is designed to meet the performance needs for ship self-defense, situational awareness and air traffic control. EASR will replace the Volume Search Radar (VSR) in the CVN 78 Class Dual Band Radar system and the AN/SPS-48/49 radar systems in numerous ship classes. The AN/SPS-48 Radars are long-range, three-dimensional (3-D) radars used to search, detect and provide space-stabilized, three-coordinate (range, bearing, height) data for air intercept control and designation to a weapon system. The AN/SPS-49A(V)1 radar system is a long range, two dimensional (2-D), L-Band air surveillance radar installed on USN major combatants. The AN/SPY-4 Volume Search Radar (VSR) is an S-Band active phased array radar deployed on CVN 78 providing volume surveillance and air traffic control. EASR funding will develop a modern 3-D air search radar that addresses the latest requirements for Aviation and Amphibious Warfare Ships and closely conforms to existing combat system interfaces, as well as aligns with existing shipboard space, weight, and power limits. The architecture and acquisition strategy for EASR is intended to drive a lower recurring cost by utilizing the same core technology for both fixed-face and rotating array variants. EASR will provide for engineering of component and system level technology improvements for equipment used by in-service air search radars.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SYSTEMS ENGINEERING - EASR | 49.586 | 8.236 | 0.545 | 0.000 | 0.545 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Conduct EASR Technical Interchange Meetings (TIMs)<br>- Continue EASR Simulator System Testing<br>- Complete Test Readiness Review for DT-3<br>- Complete Subsystem Level Testing for DT-2<br>- Commence combat system integration with the emulator<br>- Continue EASR Integrated Product Teams (IPTs) and Working Groups (WGs) to facilitate successful integration of the radar with the ships and combat system<br>- Commence land-based testing<br>- Receive Long Lead Material Authorization for Low-Rate Initial Production (LRIP) units | | | | | |
| ***FY 2020 Base Plans:***<br>- Complete DT-3 testing | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3236 / *Advanced Radar Technology* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Conduct System Verification Review (SVR), Functional Configuration Audit (FCA), Production Readiness Review (PRR), and the Transition CDR<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in FY20 is primarily due to reduced testing of the EASR system and transition to production in FY20. | | | | | |
| ***Title:*** GOVERNMENT ENGINEERING SERVICES - EASR | 13.840 | 13.499 | 1.201 | 0.000 | 1.201 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue analysis and assessment of EASR E&MD contract deliverables<br>- Continue support of EASR IPTs and WGs<br>- Continue EASR Program Management Reviews<br>- Continue support of DT-3 testing<br>- Complete support of EASR interface integration with the combat system suite<br>- Support EASR cost, schedule, and performance management contract administration, contract oversight, risk identification and risk mitigation<br>- Complete support to EASR TIMs<br>***FY 2020 Base Plans:***<br>- Complete support of DT-3 testing<br>- Conduct Transition CDR/SVR/FCA/PRR<br>- Support EASR cost, schedule, and performance management contract administration, contract oversight, risk identification, and risk mitigation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in FY20 is primarily due to the reduction of engineering services activities and reduced testing support needed in FY20. | | | | | |
| ***Title:*** PROGRAM MANAGEMENT SUPPORT - EASR | 1.264 | 1.817 | 0.187 | 0.000 | 0.187 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3236 / *Advanced Radar Technology* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Support EASR IPTs and WGs<br>- Continue the analysis and assessment of EASR E&MD contract deliverables<br>- Continue EASR Program Management Reviews<br>- Continue support of EASR schedule and performance management contract administration, contract oversight, risk identification and risk mitigation<br>- Support EASR TIMs<br>***FY 2020 Base Plans:***<br>- Complete support of EASR IPTs and WGs<br>- Complete the analysis and assessment of EASR E&MD contract deliverables<br>- Complete CLIN 0001 closeout<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease in FY20 is primarily due to reduced testing of the EASR system and the transition to production in FY20. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 64.690 | 23.552 | 1.933 | 0.000 | 1.933 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Advanced Radar Technology (ART)/EASR: The EASR Acquisition is a planned competitive procurement based on a radar specification that incorporates the latest requirements for aviation and amphibious warfare ships, closely conforms to existing combat system interfaces, and includes physical Space Weight and Power (SWAP) Not-to-Exceed (NTE) interface requirements from:
- CVN 79+, LHA, LPD 29+, FFG(X) and LX(R) for Forward-Fit
- CVN, LHA and LHD for back-fit

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3236 / *Advanced Radar Technology* |

**E. Performance Metrics**

EASR E&MD
EASR E&MD Transition CDR and SVR/FCA/PRR
EASR DT-2
EASR E&MD DT-3
EASR Production Authorization
EASR Test Readiness Review (TRR)
Long Lead Material Authorization

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3236 / *Advanced Radar Technology* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - S2F | C/CPFF | Northrop Grumman - ES : Baltimore, MD | 0.608 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.608 | - |
| Systems Engineering - EASR | C/CPIF | EASR E&MD Contractor - Raytheon : Marborough, MA | 51.593 | 49.586 | Nov 2017 | 8.236 | Nov 2018 | 0.545 | Nov 2019 | - | | 0.545 | 0.000 | 109.960 | - |
| Systems Engineering - EXI | SS/CPFF | Raytheon : Portsmouth, RI | 1.910 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.910 | - |
| | | **Subtotal** | 54.111 | 49.586 | | 8.236 | | 0.545 | | - | | 0.545 | 0.000 | 112.478 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering - EASR | WR | NSWC/DD : Dahlgren, VA | 7.012 | 3.211 | Oct 2017 | 6.429 | Nov 2018 | 0.512 | Nov 2019 | - | | 0.512 | 0.000 | 17.164 | - |
| Government Engineering - EASR | WR | NSWC/CR : Crane, IN | 1.675 | 0.621 | Jan 2018 | 0.327 | Nov 2018 | 0.036 | Nov 2019 | - | | 0.036 | 0.000 | 2.659 | - |
| Government Engineering - EASR | WR | NSWC/PHD : Port Huneme, CA | 1.098 | 0.690 | Feb 2018 | 1.390 | Nov 2018 | 0.153 | Nov 2019 | - | | 0.153 | 0.000 | 3.331 | - |
| Government Engineering - EASR | WR | NSWC/ PHI : Philadelphia, PA | 0.135 | 0.078 | Nov 2017 | 0.067 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.280 | - |
| Government Engineering - EASR | WR | NRL : Washington, DC | 0.918 | 0.307 | Nov 2017 | 0.437 | Nov 2018 | 0.048 | Nov 2019 | - | | 0.048 | 0.000 | 1.710 | - |
| Government Engineering - EASR | SS/CPFF | JHU/APL : Baltimore, MD | 4.429 | 2.608 | Nov 2017 | 2.624 | Dec 2018 | 0.288 | Dec 2019 | - | | 0.288 | 0.000 | 9.949 | - |
| Government Engineering - EASR | WR | SCSC : Wallops Island, VA | 0.232 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.232 | - |
| Government Engineering - EASR | WR | NSWC/CD : Bethesda, Maryland | 0.481 | 0.045 | Nov 2017 | 0.221 | Mar 2019 | 0.024 | Nov 2019 | - | | 0.024 | 0.000 | 0.771 | - |
| Engineering Support - EASR | WR | NAVFAC : Washington, DC | 0.036 | 4.721 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.757 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3236 / *Advanced Radar Technology* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Support - EASR | WR | SPAWAR : San Diego, CA | 0.000 | 0.331 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.331 | - |
| Engineering Support - EASR | C/CPIF | SPA : Washington, DC | 0.963 | 1.228 | Nov 2017 | 1.274 | Dec 2018 | 0.140 | Nov 2019 | - | | 0.140 | 0.000 | 3.605 | - |
| Engineering Support - EASR | WR | CIVIL AIR PATROL : TBD | 0.000 | 0.000 | | 0.060 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.060 | - |
| Engineering Support - EASR | WR | NSWC/COR : Corona, CA | 0.000 | 0.000 | | 0.159 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.159 | - |
| Engineering Support - EASR | WR | DOI : Boise, ID | 0.000 | 0.000 | | 0.511 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.511 | - |
| | | **Subtotal** | 16.979 | 13.840 | | 13.499 | | 1.201 | | - | | 1.201 | 0.000 | 45.519 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - S2F | WR | NRL : Washington, DC | 0.582 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.582 | - |
| | | **Subtotal** | 0.582 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.582 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Management Services | C/CPIF | SPA : Washington, DC | 0.877 | 0.752 | Nov 2017 | 0.947 | Nov 2018 | 0.104 | Nov 2019 | - | | 0.104 | 0.000 | 2.680 | - |
| Travel | Allot | TRAVEL : Washington, DC | 0.090 | 0.012 | Feb 2018 | 0.100 | Nov 2018 | 0.011 | Nov 2019 | - | | 0.011 | 0.000 | 0.213 | - |
| Support Management Services | C/CPIF | CACI : Washington, DC | 0.313 | 0.100 | Dec 2017 | 0.075 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.488 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3236 / *Advanced Radar Technology* | |

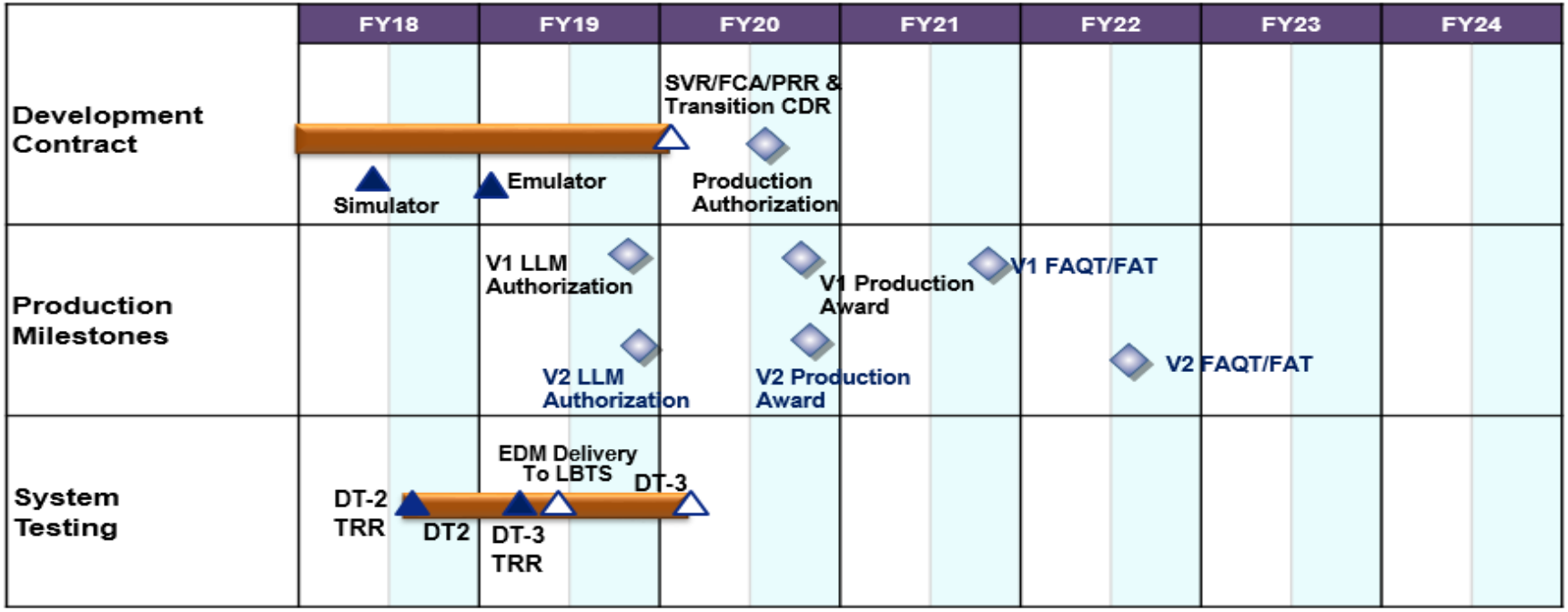
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Management Services | SS/CPIF | SPA (Bridge) : Washington, DC | 0.625 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.625 | - |
| Support Management Services | C/CPIF | TMB : Washington, DC | 0.388 | 0.074 | Oct 2017 | 0.177 | Nov 2018 | 0.019 | Nov 2019 | - | | 0.019 | 0.000 | 0.658 | - |
| Support Management Services | C/CPIF | STRATEGIC INSIGHT : Washington, DC | 0.082 | 0.035 | Jan 2018 | 0.035 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.152 | - |
| Support Management Services | WR | NSWC/DD : Dahlgren, VA | 0.270 | 0.291 | Oct 2017 | 0.483 | Dec 2018 | 0.053 | Oct 2019 | - | | 0.053 | 0.000 | 1.097 | - |
| | | **Subtotal** | 2.645 | 1.264 | | 1.817 | | 0.187 | | - | | 0.187 | 0.000 | 5.913 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 74.317 | 64.690 | | 23.552 | | 1.933 | | - | | 1.933 | 0.000 | 164.492 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3236 / *Advanced Radar Technology* |




| | |
|---|---|
| CDR | Critical Design Review |
| DT | Developmental Testing |
| FAQT/FAT | First Article Qualification Test / Factory Acceptance Testing |
| LBTS | Land Based Test Site |
| LLM | Long Lead Material |
| SVR/FCA/PRR | System Verification Review / Functional Configuration Audit / Production Readiness Review |
| TRR | Test Readiness Review |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3236 / *Advanced Radar Technology* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3236*** | | | | |
| Delivery of EASR Simulator | 2 | 2018 | 2 | 2018 |
| EASR Test Readiness Review (TRR) and (DT) 2 | 3 | 2018 | 4 | 2018 |
| EASR TRR and DT3 | 1 | 2019 | 1 | 2020 |
| Delivery of EASR Emulator | 1 | 2019 | 1 | 2019 |
| EASR EDM Delivery to LBTS | 2 | 2019 | 2 | 2019 |
| EASR V1 Long Lead Material Authorization | 4 | 2019 | 4 | 2019 |
| EASR V2 Long Lead Material Authorization | 4 | 2019 | 4 | 2019 |
| EASR System Verification Review (SVR)/Functional Configuration Audit (FCA)/ Production Readiness Review (PRR) EASR Transition CDR | 1 | 2020 | 1 | 2020 |
| EASR Production Authorization | 3 | 2020 | 3 | 2020 |
| EASR V1 Production Award | 4 | 2020 | 4 | 2020 |
| EASR V2 Production Award | 4 | 2020 | 4 | 2020 |
| EASR V1 FAQT/FAT | 4 | 2021 | 4 | 2021 |
| EASR V2 FAQT/FAT | 3 | 2022 | 3 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3301 / *Improved Capabilities SPY-1 Radar* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3301: *Improved Capabilities SPY-1 Radar* | 25.391 | 10.288 | 7.868 | 13.116 | - | 13.116 | 12.606 | 11.604 | 11.818 | 12.056 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Improved Capabilities for SPY-1 Radar: These Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions are intended to reduce
cascading failures, mitigate obsolescence issues, and improve reliability in support of Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) missions while still providing AN/ SPY-1 Radar Total Ownership Cost Reductions. Improvements, such as Solid State Insertion to address Diminishing Manufacturing Sources and Material Shortages (DMSMS), will yield reductions in annual fleet maintenance costs and is a top fleet requirement as part of the AEGIS Wholeness initiative. In addition to RM&A improvements, warfighting improvements funded in this line include: Transmitter Noise Cancellation (TNC) development will include hardware/software to counter low radar cross section, low altitude threats. Side Lobe Blanking (SLB) addresses shortfalls in mixed electronic attack environment while in an Integrated Air and Missile Defense (IAMD) mode. The Ship-Based Non-Cooperative Target Recognition (SBNCTR) program Phases 2, 2A and 3 will develop algorithms to provide classification for targets. Transition of Advanced Calibration Experiment (ACE) Phases 1 and 2 from Baseline 7 into Baseline 9. Incorporate ERACE Phases 1/2 and 3 into Baseline 9. Electronic Attack (EA) and Rapid Radar Capability Improvement Program (R2CIP) develop solutions for evolving EA threats.

FY20 includes completion of ACE Phase 1, continuation of development of ACE Phase 2, SBNCTR Phase 2A, TNC, EA improvements, and Elevated Radar Advanced Calibration Experiment (ERACE) Phase 1/2. Due to reduced SBNCTR funding in FY19, efforts have been deferred to FY20. ERACE certification is targeted to be part of Baseline 9.2.X certification, which is scheduled for 2Q FY22.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Improved Capabilities SPY-1 Radar | 10.288 | 7.868 | 13.116 | 0.000 | 13.116 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |
| - Continue development of additional cost reduction initiatives | | | | | |
| - Continue TNC development and conduct Preliminary Design Review (PDR) and Critical Design Review (CDR) | | | | | |
| - Initiate EA improvements technology development | | | | | |
| - Continue Radar Integrated Product Team (IPT) support for all baselines | | | | | |
| - Continue ACE Phase 1 development | | | | | |
| - Continue ERACE Phase V2 development | | | | | |
| - Conduct ERACE Phase 1/2 testing | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue solid state technology insertion analysis<br>***FY 2020 Base Plans:***<br>-Conduct ACE Phase 1 Certification Baseline 9<br>-Complete ACE Phase 1 development Baseline 9<br>-Initiate ACE Phase 2 development<br>-Complete ACE Phase 2 Requirements Definition<br>-Restart SBNCTR Phase 2A development; includes integration of other sensors and threats<br>-Conduct SBNCTR Phase 2A IPR#3<br>-Conduct TNC qualification testing<br>-Continue EA improvements technology development<br>-Initiate GaN solutions development for MWT DMSMS, to include solid state component replacement of analog vacuum tube equipment<br>-Continue ERACE Phase 1/2 development<br>-Conduct ERACE Phase 1/2 FLEX Event to test multiple sensors in an at-sea operational environment<br>-Continue Solid State Technology Insertion Analysis<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 increase is due to restart of SBNCTR Phase 2 program, initiation of GaN solutions for Microwave Tube (MWT) DMSMS and increased scope to conduct ERACE FLEX event. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.288 | 7.868 | 13.116 | 0.000 | 13.116 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • O&MN/1C1C/0702228N: *O&M,N AEGIS Wholeness SPY Transmitter Reliability* | 4.155 | 4.188 | 4.358 | - | 4.358 | 4.276 | 4.400 | 4.427 | 4.514 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |

**D. Acquisition Strategy**

Improved Capabilities SPY-1 Reliability, Maintainability, and Availability (RM&A) will design and develop an Ordnance Alterations (ORDALT) Package for fixes and modifications to known transmitter, microwave tube (MWT), and logistic shortcomings. Investment in development of SPY-1 RM&A improvements to address failure mechanisms and improve reliability is planned to continue beyond the FYDP. Radar capability upgrades (SBNCTR, ACE and ERACE) and reliability improvements will be incorporated into Baseline 7, Baseline 9 and follow.

**E. Performance Metrics**

- Complete Advanced Calibration Experiment (ACE) Baseline (BL) 9 Phase 1 demo
- Complete Transmitter Noise Cancellation (TNC) System Requirements Review (SRR)
- Complete ACE Baseline 9 Phase 1 testing
- Complete TNC Preliminary Design Review (PDR)
- Complete EA studies and R2CIP requirements analysis and spec updates
- Complete SBNCTR Phase 2A integration and test
- Complete TNC Critical Design Review (CDR)
- Complete Sidelobe Blanking (SLB) requirements analysis
- Complete SBNCTR Phase 2A EA
- Complete ACE Phase 1 certification and development
- Complete EA and R2CIP technology development
- Complete TNC integration and test
- Complete TNC merge to Common Source Library (CSL)
- Complete ACE Phase 2 requirements definition
- Complete ACE Phase 2 demo
- Complete ACE Phase 2 certification testing
- Complete EA improvements and R2CIP implementation and testing
- Complete SBNCTR Phase 3 requirements definition
- Complete ERACE Phase 1/2 requirements definition
- Complete ERACE Phase 1/2 Flex Event
- Complete ERACE Phase 1/2 testing
- Complete ERACE Phase 1/2 certification
- Complete ERACE Phase 3 requirements definition
- Complete ERACE Phase 3 demos
- Complete ERACE Phase 3 testing
- Complete GaN solutions for MWT DMSMS concept development
- Complete GaN solutions for MWT DMSMS requirements analysis and specifications updates
- Complete GaN solutions for MWT DMSMS technology development

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |

- Complete SBNCTR Phase 2A IPR #3
- Complete SBNCTR Phase 3 IPR #1
- Complete SBNCTR Phase 3 IPR #2
- Complete TNC qualification testing

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3301 / *Improved Capabilities SPY-1 Radar* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYSTEM ENGINEERING | MIPR | Office of Naval Research : Arlington, VA | 1.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.000 | - |
| SYSTEM ENGINEERING | C/CPFF | Raytheon : Sudbury, MA | 1.941 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.941 | - |
| SYSTEM ENGINEERING | WR | NSWC/Crane, IN : Crane, IN | 12.865 | 1.347 | Oct 2017 | 3.734 | Dec 2018 | 3.684 | Nov 2019 | - | | 3.684 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | SS/CPFF | Lockheed Martin : Moorestown, NJ | 5.046 | 5.584 | Jan 2018 | 1.597 | Jan 2019 | 5.670 | Dec 2019 | - | | 5.670 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | SS/CPFF | AEGIS Techrep : Moorestown, NJ | 0.439 | 0.337 | Nov 2017 | 0.222 | Nov 2018 | 0.354 | Dec 2019 | - | | 0.354 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | SS/FP | APL/JHU : Laurel, MD | 0.465 | 0.370 | Mar 2018 | 0.365 | Feb 2019 | 0.384 | Nov 2019 | - | | 0.384 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | CSCS : Dahlgren, VA | 0.194 | 0.148 | Jun 2018 | 0.062 | Dec 2018 | 0.062 | Jun 2020 | - | | 0.062 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | NRL : Washington, DC | 0.375 | 0.282 | Nov 2017 | 0.283 | Dec 2018 | 0.396 | Nov 2019 | - | | 0.396 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | MIPR | MIT/LL : Lexington, MA | 0.450 | 0.450 | Jun 2018 | 0.204 | Jan 2019 | 0.450 | Mar 2020 | - | | 0.450 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | NSWC DD : Dahlgren, VA | 1.674 | 1.302 | Oct 2017 | 0.995 | Nov 2018 | 1.677 | Nov 2019 | - | | 1.677 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | WR | NSWC/PHD : Port Hueneme, CA | 0.195 | 0.124 | Nov 2017 | 0.136 | Nov 2018 | 0.169 | Nov 2019 | - | | 0.169 | Continuing | Continuing | Continuing |
| SYSTEM ENGINEERING | MIPR | DTIC : Fort Belvior, VA | 0.050 | 0.182 | Oct 2018 | 0.050 | Mar 2019 | 0.050 | Dec 2019 | - | | 0.050 | 0.000 | 0.332 | - |
| | | **Subtotal** | 24.694 | 10.126 | | 7.648 | | 12.896 | | - | | 12.896 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |

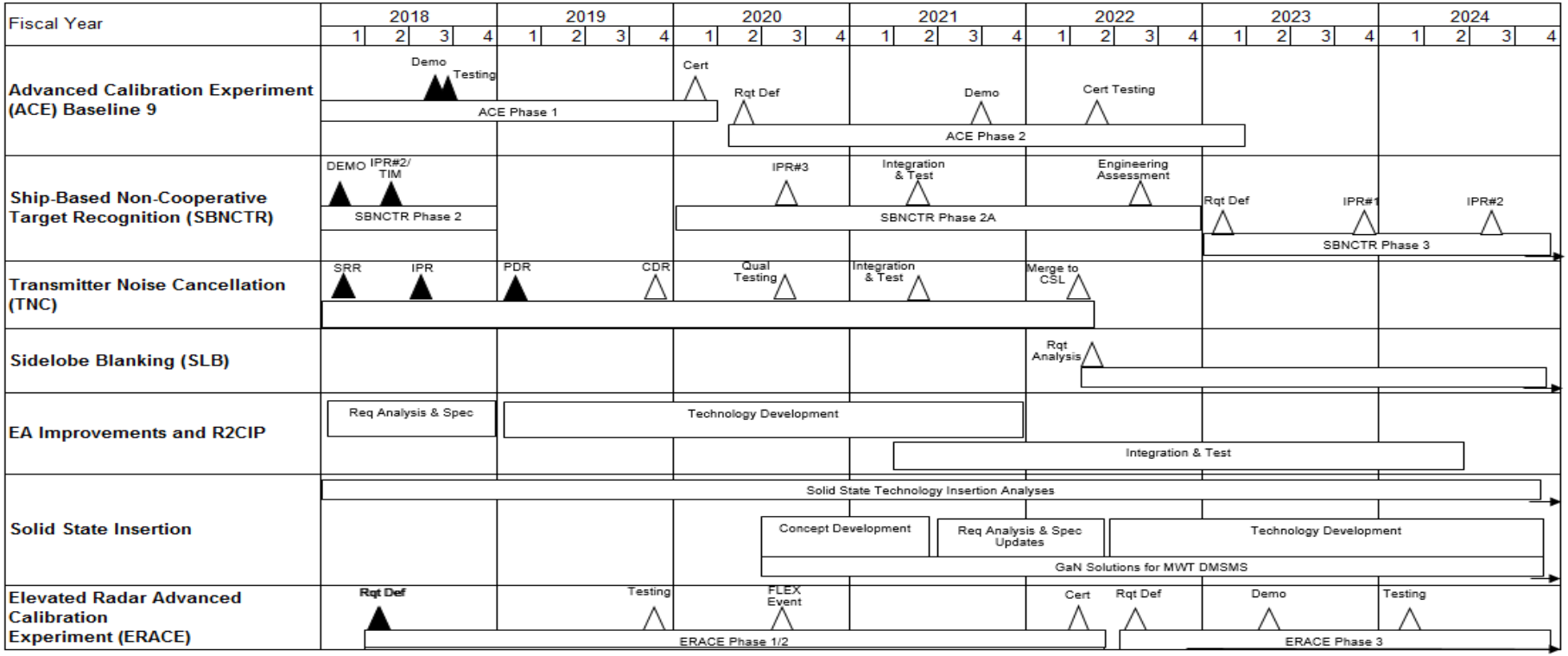
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | PEOIWS2 : Washington, DC | 0.010 | 0.020 | Jan 2018 | 0.020 | Dec 2018 | 0.020 | Jan 2020 | - | | 0.020 | Continuing | Continuing | Continuing |
| Support Management Services | C/CPIF | SPA : Washington, DC | 0.506 | 0.142 | Nov 2017 | 0.200 | Dec 2018 | 0.200 | Nov 2019 | - | | 0.200 | 0.000 | 1.048 | - |
| Support Management Services | SS/CPIF | SPA (Bridge) : Washington, DC | 0.181 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.181 | - |
| | | **Subtotal** | 0.697 | 0.162 | | 0.220 | | 0.220 | | - | | 0.220 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 25.391 | 10.288 | | 7.868 | | 13.116 | | - | | 13.116 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |




SBNCTR PHASE 3, SLB, EA Improvements and R2CIP, and Solid State Insertion continue beyond the FYDP. ERACE is targeted to be part of Baseline 9.2.X, which is scheduled for 2Q FY 22."

**Acronyms:**

CDR: Critical Design Review
CSL: Common Source Library
DMSMS: Diminishing Manufacturing Sources and Material Shortages
EA: Electronic Attack
ERACE: Elevated Radar ACE
FLEX: Fleet Exercise
GaN: Gallium Nitride
IPR: In-Progress Review
MWT: Microwave Tube
PDR: Preliminary Design Review
R2CIP: Rapid Radar Capability Improvement Program
SS: Solid State
SRR: System Requirements Review
TIM: Technical Interchange Meeting

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3301*** | | | | |
| Solid State Technology Insertion Analyses | 1 | 2018 | 4 | 2024 |
| TNC SRR | 1 | 2018 | 1 | 2018 |
| EA Improvements and R2CIP Rqt Analysis & Specification Updates | 1 | 2018 | 4 | 2018 |
| SBNCTR Phase 2 Demo | 1 | 2018 | 1 | 2018 |
| ERACE Phase 1/2 Requirements Definition | 2 | 2018 | 2 | 2018 |
| SBNCTR Phase 2 IPR #2/TIM | 2 | 2018 | 2 | 2018 |
| ACE Phase 1 Demo | 3 | 2018 | 3 | 2018 |
| TNC IPR | 3 | 2018 | 3 | 2018 |
| ACE Phase 1 Testing | 3 | 2018 | 3 | 2018 |
| EA Improvements and R2CIP Technology Development | 1 | 2019 | 4 | 2021 |
| TNC PDR | 1 | 2019 | 1 | 2019 |
| TNC CDR | 4 | 2019 | 4 | 2019 |
| ERACE Phase 1/2 Testing | 4 | 2019 | 4 | 2019 |
| ACE Phase 1 Certification | 1 | 2020 | 1 | 2020 |
| ACE Phase 2 Requirements Definition | 2 | 2020 | 2 | 2020 |
| SBNCTR Phase 2A IPR #3 | 3 | 2020 | 3 | 2020 |
| TNC Qualification Testing | 3 | 2020 | 3 | 2020 |
| Gan Solutions Development for MWT DMSMS Concept Development | 3 | 2020 | 2 | 2021 |
| ERACE Phase 1/2 Flex Event | 3 | 2020 | 3 | 2020 |
| SBNCTR Phase 2A Integration & Test | 2 | 2021 | 2 | 2021 |
| TNC Integration & Test | 2 | 2021 | 2 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3301 / *Improved Capabilities SPY-1 Radar* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| EA Improvements and R2CIP Integration and Test | 2 | 2021 | 2 | 2024 |
| ACE Phase 2 Demo | 3 | 2021 | 3 | 2021 |
| GaN Solutions Development for MWT DMSMS Req Analysis & Spec Updates | 3 | 2021 | 2 | 2022 |
| ERACE Phase 1 / 2 Certification | 2 | 2022 | 2 | 2022 |
| ACE Phase 2 Certification Testing | 2 | 2022 | 2 | 2022 |
| TNC Merge to Common Source Library | 2 | 2022 | 2 | 2022 |
| SLB Requirements Analysis | 2 | 2022 | 2 | 2024 |
| SBNCTR Phase 2A Engineering Assessment | 3 | 2022 | 3 | 2022 |
| ERACE Phase 3 Requirements Definition | 3 | 2022 | 3 | 2022 |
| GaN Solutions Development for MWT DMSMS Technology Development | 3 | 2022 | 4 | 2024 |
| SBNCTR Phase 3 Requirements Definition | 1 | 2023 | 1 | 2023 |
| ERACE Phase 3 Demo | 2 | 2023 | 2 | 2023 |
| SBNCTR Phase 3 IPR #1 | 4 | 2023 | 4 | 2023 |
| ERACE Phase 3 Testing | 1 | 2024 | 1 | 2024 |
| SBNCTR Phase 3 IPR #2 | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3408 / *AN/SPS-49 Technical Refresh* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3408: *AN/SPS-49 Technical Refresh* | 0.000 | 0.000 | 0.000 | 17.500 | - | 17.500 | 8.100 | 1.000 | 0.000 | 0.000 | 0.000 | 26.600 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

This is a new start. SPS-49 tech refresh was funded in FY18 and FY19 leveraging OSD Other Transactional Authority (OTA) contract for Industrial Base Analysis and Sustainment Program (IBAS).

**A. Mission Description and Budget Item Justification**

AN/SPS-49 Technology Refresh: As the only Air Surveillance Radar on the LSD 41/49 class ships, continued degradation and increasingly low radar availability of the AN/SPS-49 Radar is greatly impacting deployed missions, impacting safety of flight and affecting LSD Air Warfare capability and operations. Funding is to complete development, test and evaluation, validation and integration of a technology refresh of the below deck hardware for the AN/SPS-49A(V)1 Long Range Air Surveillance Radar. This technology refresh will include Reliability, Maintainability, and Availability (RM&A) improvements and solid state technology insertions which will reduce cascading failures and mitigate obsolescence issues. In addition, this effort replaces key components to include: transmitter, receiver, exciter, antenna elevation servo control, radar system control, display and signal data processor (SDP). A digital receiver/exciter (DREX) with high-performance computing technology will be a key component in the new system. The current SPS-49 radar has no software so new software is being developed to mimic the current radar functions to maintain compatibility with internal and external interfaces. This effort will improve SPS-49 electronic protection, have increased surveillance range and increased slow moving small target detection, as well as reduce total ownership cost with lower unit cost and smaller size/weight/power requirements. Funding will also be used to address potential hardware and software issues discovered during land based test events and integration with the Ship Self Defense System (SSDS).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AN/SPS-49 Technology Refresh | 0.000 | 0.000 | 17.500 | 0.000 | 17.500 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>- Initiate system hardware and software design and development<br>- Conduct Critical Design Review (CDR)<br>- Conduct Test Readiness Review (TRR)<br>- Receive prototype Build of Material (BOM)<br>- Complete top level drawings/models | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3408 / *AN/SPS-49 Technical Refresh* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Build prototype to validate models<br>- Commence collection of Reliability, Availability and Maintainability data<br>- Commence development of provisioning technical data<br>- Complete interface design<br>- Commence integration of DREX with Signal Data Processor (SDP) and transmitter designs<br>- Complete software test description<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 is the first year of funding for this effort. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 17.500 | 0.000 | 17.500 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Technology developed using Small Business Innovative Research (SBIR), Rapid Insertion Funds (RIF), Technology Insertion Funds (TIF) and OSD's Industrial Base Analysis and Sustainment (IBAS) programs will be integrated to provide below deck technology refresh of the AN/SPS-49 Long Range Air Surveillance Radar. Integration of the technologies, final design, procurement of three Engineering Development Models (EDM) (procured under prior efforts funded by OSD) and test and evaluation will be accomplished utilizing an Other Transactional Authority (OTA) contract. In conjunction with the prime contractor, the government will integrate the EDM with external interfaces and perform test and evaluation of hardware and software at a Land Based Test Site (LBTS) at Wallops Island. Final integration into the combat system and combat systems certification will be accomplished at the LBTS during the LSD 41 SSDS qualification event in Q3FY21.

To accomplish the SPS-49 tech refresh, the Navy is leveraging an Other Transactional Authority (OTA) contract for Industrial Base Analysis and Sustainment Program (IBAS) Radar Systems Should Cost Model/Prototypes for Defense Affordability and Industrial Base Resiliency awarded by OSD to the Army (Picatinny). OSD IBAS provided start-up funding for the first three phases. Phase 1 and 2 were completed in FY18 (including Analysis of Alternatives and efforts through Preliminary Design Review) and Phase 3 (efforts through Critical Design Review) will be completed in FY19. Phase 4 and 5 executed in FY20, will complete Non Recurring Engineering (NRE), Technical Readiness Review (TRR), Functional Configuration Audit (FCA), Physical Configuration Audit (PCA), shock, Electromagnetic Interference (EMI) and combat system integration/validation.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3408 / *AN/SPS-49 Technical Refresh* |

**E. Performance Metrics**

Complete Contract Award
Complete AN/SPS-49 technology refresh development
Complete Critical Design Review (CDR)
Conduct Test Readiness Review (TRR)
Complete system/subsystem integration testing
Complete Wallops Island SSDS integration testing
Complete Functional Configuration Audit (FCA)
Complete Physical Configuration Audit (PCA)
Complete Shock and Electromagnetic Interference (EMI) Testing

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604501N / *Advanced Above Water Sensors* | Project (Number/Name)<br>3408 / *AN/SPS-49 Technical Refresh* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering | MIPR | Army : Picatinny, NJ | 0.000 | 0.000 | | 0.000 | | 14.440 | Nov 2019 | - | | 14.440 | 0.000 | 14.440 | - |
| Government Engineering | WR | NRL : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.100 | Oct 2019 | - | | 0.100 | 0.000 | 0.100 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 14.540 | | - | | 14.540 | 0.000 | 14.540 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering | WR | NRL : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.375 | Oct 2019 | - | | 0.375 | 0.000 | 0.375 | - |
| Government Engineering | WR | NSWC/CR : Crane, IN | 0.000 | 0.000 | | 0.000 | | 0.300 | Oct 2019 | - | | 0.300 | 0.000 | 0.300 | - |
| Government Engineering | WR | NSWC/PHD : Port Huneme, CA | 0.000 | 0.000 | | 0.000 | | 0.235 | Oct 2019 | - | | 0.235 | 0.000 | 0.235 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.910 | | - | | 0.910 | 0.000 | 0.910 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering | WR | NRL : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.600 | Oct 2019 | - | | 0.600 | 0.000 | 0.600 | - |
| Government Engineering | WR | NSWC/CR : Crane, IN | 0.000 | 0.000 | | 0.000 | | 0.500 | Oct 2019 | - | | 0.500 | 0.000 | 0.500 | - |
| Government Engineering | WR | NSWC/PHD : Port Huneme, CA | 0.000 | 0.000 | | 0.000 | | 0.400 | Oct 2019 | - | | 0.400 | 0.000 | 0.400 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.500 | | - | | 1.500 | 0.000 | 1.500 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3408 / *AN/SPS-49 Technical Refresh* |

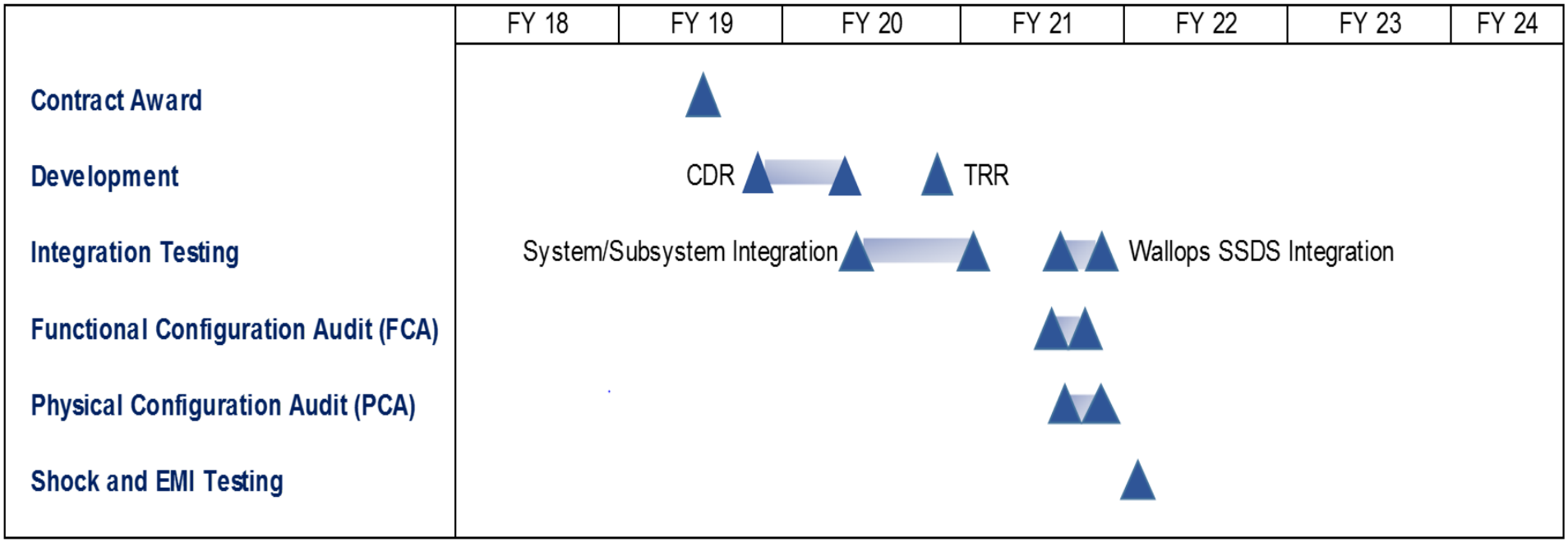
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Management Services | C/CPIF | ICI : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.150 | Nov 2019 | - | | 0.150 | 0.000 | 0.150 | - |
| Support Management Services | C/CPIF | TMB : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.150 | Nov 2019 | - | | 0.150 | 0.000 | 0.150 | - |
| Support Management Services | C/CPIF | CACI : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.075 | Nov 2019 | - | | 0.075 | 0.000 | 0.075 | - |
| Support Management Services | C/CPIF | SPA : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.150 | Nov 2019 | - | | 0.150 | 0.000 | 0.150 | - |
| Travel | Sub Allot | PEOIWS2 : Washington, DC | 0.000 | 0.000 | | 0.000 | | 0.025 | Oct 2019 | - | | 0.025 | 0.000 | 0.025 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.550 | | - | | 0.550 | 0.000 | 0.550 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 17.500 | | - | | 17.500 | 0.000 | 17.500 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3408 / *AN/SPS-49 Technical Refresh* |




This budget funds the test and integration into a SPS-49 radar system and integration during the SSDS qualification event in Q3FY21.

Budget profile capitalizes on early development funded by Small Business Innovation Research (SBIR), Rapid Innovation Funds (RIF), OSD Industrial Base Analysis and Sustainment (IBAS) Program in FY 19.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604501N / *Advanced Above Water Sensors* | **Project (Number/Name)**<br>3408 / *AN/SPS-49 Technical Refresh* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3408*** | | | | |
| Contract Award | 3 | 2019 | 3 | 2019 |
| Technology Refresh Development | 1 | 2020 | 4 | 2020 |
| Critical Design Review (CDR) | 4 | 2019 | 1 | 2020 |
| Test Readiness Review (TRR) | 4 | 2020 | 4 | 2020 |
| System/Subsystem Integration Testing | 4 | 2020 | 1 | 2021 |
| Wallops Island Ship Self Defense System (SSDS) Integration | 3 | 2021 | 4 | 2021 |
| Functional Configuration Audit | 3 | 2021 | 4 | 2021 |
| Physical Configuration Audit | 3 | 2021 | 4 | 2021 |
| Shock and Electro Magnetic Interference (EMI) Testing | 1 | 2022 | 1 | 2022 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,600.649 | 142.167 | 126.932 | 84.663 | - | 84.663 | 82.685 | 93.103 | 95.811 | 96.653 | Continuing | Continuing |
| 0219: *Sub Sonar Improvement (ENG)* | 1,026.925 | 84.074 | 67.030 | 57.390 | - | 57.390 | 62.783 | 62.871 | 62.545 | 63.800 | Continuing | Continuing |
| 0742: *Sub Integrated Ant System* | 310.884 | 15.267 | 15.426 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 341.577 |
| 0775: *Submarine Supt Equip Prog* | 27.733 | 9.082 | 28.408 | 27.273 | - | 27.273 | 19.902 | 30.232 | 33.266 | 32.853 | Continuing | Continuing |
| 1411: *Sub Tact Comm System* | 228.337 | 14.443 | 16.068 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 258.848 |
| 9999: *Congressional Adds* | 6.770 | 19.301 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 26.071 |

**Note**

Funding for the following projects has been realigned out of PE 0604503N into PE 0604280N as part of Program Element Consolidation starting in FY20: Project 0742 - Sub Integrated Antenna System, Project 1411 - Sub Tactical Communication System.

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $4.000 million to account for the availability of prior year execution balances.

SSN-688 & Trident Modernization delivers block updates to Submarine Sonar systems, provides improved secure voice and data communications capabilities, develops improved Submarine Electronic Warfare (EW) systems, and provides a fully integrated and tested Common Submarine Radio Room (CSRR). These development activities ensure all Submarine Classes maintain clear acoustical, tactical, and operational superiority over Submarines and Surface Combatants in Joint Littoral Warfare, Joint Intelligence Surveillance Reconnaissance (ISR), Indications and Warnings, Information Operations including Cyber, and Special Operations Force (SOF) support. Current developments are focused on supporting Joint Littoral Warfare, Regional Sea Denial, Strike Group Support, Diesel Submarine Detection, Joint Surveillance and Peacetime Engagement, Space and Electronic Warfare, Intelligence Collection, Maritime Protection, and Joint Strike.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604503N *I SSN-688 & Trident Modernization* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 130.981 | 126.932 | 110.805 | - | 110.805 |
| Current President's Budget | 142.167 | 126.932 | 84.663 | - | 84.663 |
| Total Adjustments | 11.186 | 0.000 | -26.142 | - | -26.142 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -3.813 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -25.846 | - | -25.846 |
| • Rate/Misc Adjustments | -0.001 | 0.000 | -0.296 | - | -0.296 |
| • Congressional Directed Reductions Adjustments | -5.000 | - | - | - | - |
| • Congressional Add Adjustments | 20.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Program Increase* | 19.301 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 19.301 | 0.000 |
| Congressional Add Totals for all Projects | 19.301 | 0.000 |

**Change Summary Explanation**

FY 2020 funding request reflects a net decrease of $26.142 million.

FY 2020 funding request was reduced by $33.100 million in order to support PEO C4I RDTEN Budget Line Item Consolidation to allow the Navy to more quickly react to changes in C4I technology and changes in Cyber requirements, $5.217 million to adjust the funding profile for Common Submarine Radio Room Cyber Security Workforce, and $0.296 million to account for other rate / miscellaneous adjustments. The FY 2020 funding request was further reduced by $4.000 million to account for the availability of prior year execution balances.

FY 2020 funding decrease was offset by $12.075 million for development of Future Electronic Warfare (EW) systems and EW Tactical TEMPALT (EWTT) for SSNs. Additional $4.600 million was realigned to address AN/BRR-6 Item Unique Identification (IUID) implementation to collect and manage systems data to

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604503N *I SSN-688 & Trident Modernization* |

improve Fleet reliability and sustainability and addresses reduced diameter High-Lift Auxiliary Wire (HLAW) development requirement to improve system reliability and reduce detectability.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0219 / *Sub Sonar Improvement (ENG)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0219: *Sub Sonar Improvement (ENG)* | 1,026.925 | 84.074 | 67.030 | 57.390 | - | 57.390 | 62.783 | 62.871 | 62.545 | 63.800 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program delivers block updates to Sonar Systems installed on SSN 688, 688I, SSN 21, VIRGINIA, SSBN, and SSGN Class Submarines to maintain clear acoustical, tactical, and operational superiority over Submarines and Surface Combatants in all scenarios through detection, classification, localization, and contact following.

Acoustics Rapid COTS Insertion (A-RCI) provides multi-phased evolutionary development geared toward addressing acoustic superiority issues through the rapid introduction of interim development products applicable to all Classes of Submarines.
- A-RCI Phase I and II introduced Towed Array processing improvements
- Phase III introduced Spherical Array processing improvements
- Phase IV provided High Frequency (HF) Array processing improvements for SSN 688I, SSGN, VIRGINIA, and SSN 21 Class Submarines.

As part of the Navy's plan to maintain acoustic superiority for in-service submarines, a joint cooperative effort was established to deliver annual Advanced Processing Builds (APBs) to prevent obsolescence and deliver ongoing capability improvements.
- Capabilities in the APBs will be integrated as part of A-RCI certified systems.
- Development of the Large Vertical Array (LVA) will improve detection and enhanced tactical situational awareness capability for tracking targets of interest, and supports acoustic superiority objectives for the VIRGINIA and OHIO Class Submarines.

Sensor Efforts provide increased operational capabilities for littoral operations, situational awareness, and reliability improvements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** APB Productionization | 12.724 | 12.519 | 14.461 | 0.000 | 14.461 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** APB Productionization provides for the transition of APB capability improvements to the Fleet for integration, testing and formal certification. | | | | | |
| ***FY 2019 Plans:***<br>-Continue Advanced Processing Build (APB) Sea Testing, Integration, and Certification. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Transition APB software from development to A-RCI for integration, testing, and formal certification.<br>-Ensure continued transition of the SSBN legacy sonar system to the TI/APB model and the incorporation of in-board signal processing associated with the Large Vertical Array (LVA).<br>***FY 2020 Base Plans:***<br>-Continue Advanced Processing Build (APB) Sea Testing, Integration, and Certification.<br>-Continue transition of APB software from development to A-RCI for integration, testing, and formal certification.<br>-Ensure continued transition of the SSBN legacy sonar system to the TI/APB model<br>-Continue in-board signal processing associated with the Large Vertical Array (LVA).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 emphasizes APB signal processing requirements for TI-20 to include the Large Vertical Array (LVA) on VA Class submarines resulting in an increase in funding. Efforts also include additional system architecture redesign to address increased requirements associated with Information Assurance (IA) and Cybersecurity. | | | | | |
| ***Title:*** Integration and Testing | 34.484 | 34.056 | 39.201 | 0.000 | 39.201 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Integration and Testing provides support to integrate and test APB's into all Submarine Classes containing multiple sensor systems.<br>***FY 2019 Plans:***<br>-Support Advanced Processing Builds installed on SSN 688I, SSN 688, SSN 21, SSGN 726, SSBN, and VA Class Submarines.<br>-Continue the incorporation of integration and testing associated with the conversion of the SSBN legacy sonar system to the TI/APB model; as well as, signal processing in support of the Large Vertical Array (LVA).<br>***FY 2020 Base Plans:***<br>-Continue support of Advanced Processing Builds installed on SSN 688I, SSN 688, SSN 21, SSGN 726, SSBN, and VA Class Submarines.<br>-Continue the incorporation of integration and testing associated with the conversion of the SSBN legacy sonar system to the TI/APB model. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue integration and testing associated with signal processing in support of Large Vertical Array (LVA) on SSBN and VA Class submarines.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 incorporates APB signal processing requirements for TI-20 to include the Large Vertical Array (LVA) on VA Class submarines resulting in an increase in integration and testing requirements. Efforts also include integration and testing associated with system architecture redesign to address increased requirements associated with Information Assurance (IA) and Cybersecurity. | | | | | |
| ***Title:*** Large Vertical Array (LVA)<br>***Articles:***<br>***Description:*** Provides funding for the development of Large Vertical Array (LVA) capability in the areas of detection and tracking for back-fit installation on VIRGINIA Class and OHIO Class Submarines.<br>***FY 2019 Plans:***<br>-Finalize development of Large Vertical Array (LVA) acoustic modules; to include acoustic sensors, array material, outboard electronics, fairings, and associated cabling<br>-Finalize development of mechanical fixtures (required to manufacture, transport, and install an LVA ship-set on a submarine), to effectively incorporate the required capabilities into the TI/APB model for back-fit modernization.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 concludes LVA acoustic module and mechanical fixture development and fabrication. | 33.283<br>- | 16.800<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** A-RCI Acoustic Superiority Integration<br>***Articles:*** | 3.583<br>- | 3.655<br>- | 3.728<br>- | 0.000<br>- | 3.728<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Maintain Acoustic Superiority for In-service Submarines to deliver bi-annual Advance Processing Builds (APBs) to prevent obsolescence and deliver emerging capability improvements for current and future threats.<br><br>***FY 2019 Plans:***<br>-Continue development of emerging capability improvements for current and future threats by supporting development, integration, and testing of emerging capability improvements in passive long range detection/wide area search for current and future threats in support of Navy SSN/SSBN Acoustic Superiority initiatives.<br><br>***FY 2020 Base Plans:***<br>-Continue development of emerging capability improvements for current and future threats by supporting development, integration, and testing of emerging capability improvements in passive long range detection/wide area search for current and future threats in support of Navy SSN/SSBN Acoustic Superiority initiatives.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 integrates additional software enabled capability enhancements across various Submarine Classes resulting in a funding increase. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 84.074 | 67.030 | 57.390 | 0.000 | 57.390 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2150: *SSN Acoustic Equipment* | 354.253 | 328.658 | 366.968 | - | 366.968 | 381.207 | 430.868 | 518.736 | 534.697 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Acoustic Systems:
-A-RCI utilizes an open architecture and Commercial Off-the-Shelf (COTS) products in support of new and upgraded sonar systems.
-Program Reviews with the Milestone Decision Authority (MDA) are conducted granting approval for the contract

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |

production options.

Large Vertical Array (LVA):
-Performance specification-based contract in support of LVA to enhance SSN/SSBN platform capability and situational awareness.

**E. Performance Metrics**

-The A-RCI program will modernize approximately 8-12 SSNs per year through executing bi-annual software Advanced Processor Builds (APBs) and bi-annual Technical Insertions (TIs).
-Beginning with FY 2017 installations, the A-RCI program will modernize approximately 2-3 SSBNs per year through bi-annual APBs/TIs.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | SS/CPIF | LMC : Manassas, VA | 360.688 | 15.647 | Dec 2017 | 15.386 | Dec 2018 | 21.526 | Dec 2019 | - | | 21.526 | Continuing | Continuing | Continuing |
| Ancillary Hardware Development | SS/CPFF | ARL University of Texas : Austin, TX | 40.635 | 3.425 | Mar 2018 | 3.371 | Mar 2019 | 2.903 | Mar 2020 | - | | 2.903 | Continuing | Continuing | Continuing |
| Systems Engineering | SS/CPFF | Johns Hopkins APL : Baltimore, MD | 42.776 | 3.433 | Dec 2017 | 3.391 | Dec 2018 | 2.919 | Dec 2019 | - | | 2.919 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | LMC : VA - Keyport | 39.699 | 3.690 | Jan 2018 | 3.591 | Jan 2019 | 3.089 | Jan 2020 | - | | 3.089 | Continuing | Continuing | Continuing |
| Primary Hardware Development | C/CPIF | Progeny Systems : Manassas, VA | 70.639 | 6.669 | Jan 2018 | 6.984 | Jan 2019 | 5.959 | Jan 2020 | - | | 5.959 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NUWC : Newport, RI | 178.551 | 5.561 | Dec 2017 | 5.453 | Dec 2018 | 9.142 | Dec 2019 | - | | 9.142 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Carderock, MD | 31.222 | 2.163 | Dec 2017 | 2.060 | Dec 2018 | 2.613 | Dec 2019 | - | | 2.613 | Continuing | Continuing | Continuing |
| TB-29X Development | C/CPIF | L-3 CSC : Millersville, MD | 15.675 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.675 | - |
| LVA Development | C/CPIF | Electric Boat : Groton, CT | 13.265 | 33.283 | Nov 2017 | 16.800 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 63.348 | - |
| | | **Subtotal** | 793.150 | 73.871 | | 57.036 | | 48.151 | | - | | 48.151 | Continuing | Continuing | N/A |

**Remarks**

Performer specific cost growth in FY 2020 provides for the development necessary to support APB signal processing requirements for TI-20 to include the Large Vertical Array (LVA) on VA Class submarines, additional system architecture redesign to address increased requirements associated with Information Assurance (IA) and Cybersecurity; as well as, additional software enabled capability enhancements across various Submarine Classes addressing Acoustic Superiority.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Software Development | C/CPIF | General Dynamics, AIS : Fairfax, VA | 165.289 | 5.047 | Dec 2017 | 5.028 | Dec 2018 | 4.619 | Dec 2019 | - | | 4.619 | Continuing | Continuing | Continuing |
| Primary Software Development | C/CPFF | Sedna Digital, : Manassas, VA | 40.640 | 3.920 | Dec 2017 | 3.802 | Dec 2018 | 3.493 | Dec 2019 | - | | 3.493 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 205.929 | 8.967 | | 8.830 | | 8.112 | | - | | 8.112 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0219 / *Sub Sonar Improvement (ENG)* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test and Evaluation | WR | OPTEVFOR : Norfolk, VA | 10.781 | 0.485 | Dec 2017 | 0.470 | Dec 2018 | 0.432 | Dec 2019 | - | | 0.432 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 10.781 | 0.485 | | 0.470 | | 0.432 | | - | | 0.432 | Continuing | Continuing | N/A |

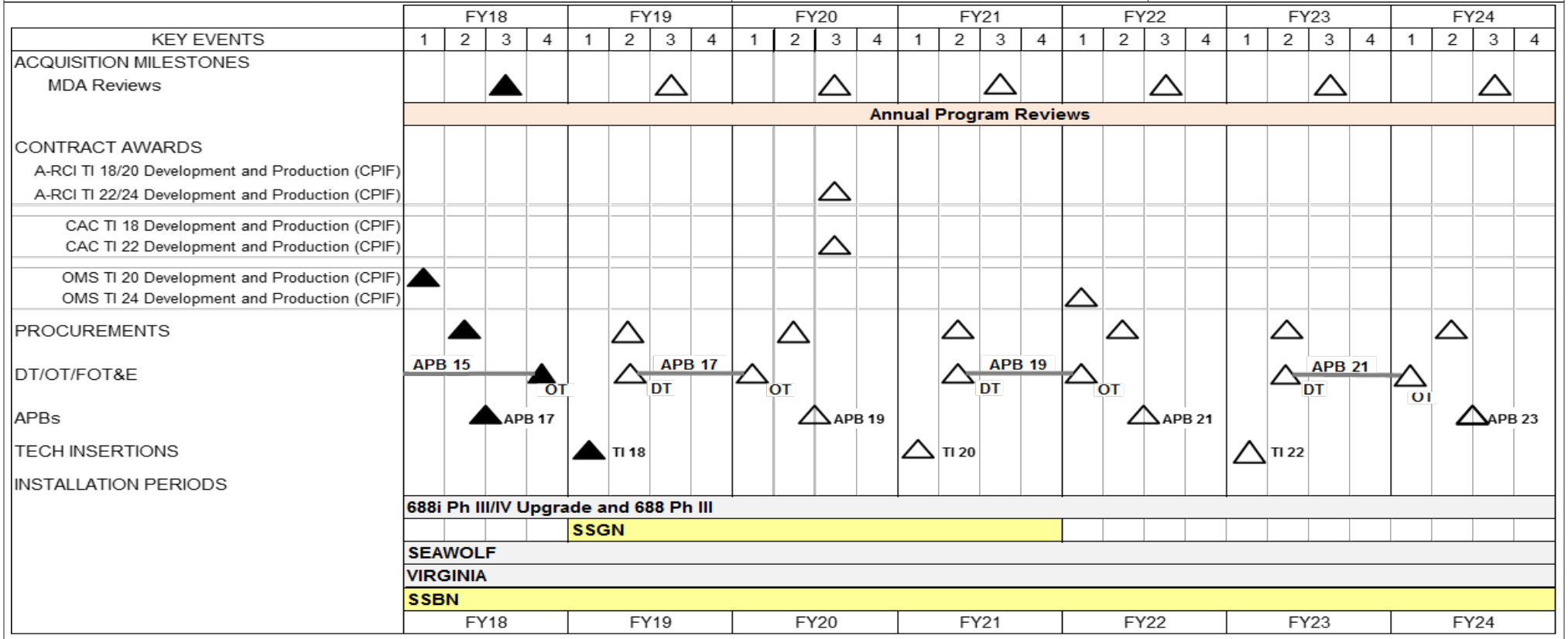
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Support Services | C/FFP | Alion, BAH, AECOM : Washington, DC | 14.628 | 0.657 | Dec 2017 | 0.600 | Dec 2018 | 0.601 | Dec 2019 | - | | 0.601 | Continuing | Continuing | Continuing |
| Travel | WR | NAVSEA : Washington, DC | 2.437 | 0.094 | Dec 2017 | 0.094 | Dec 2018 | 0.094 | Dec 2019 | - | | 0.094 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 17.065 | 0.751 | | 0.694 | | 0.695 | | - | | 0.695 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,026.925 | 84.074 | | 67.030 | | 57.390 | | - | | 57.390 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |




Completed Milestone

Upcoming Milestone

APB: Advanced Processing Builds

A-RCI: Acoustic – Rapid Commercial Off the Shelf (COTS) Insertion

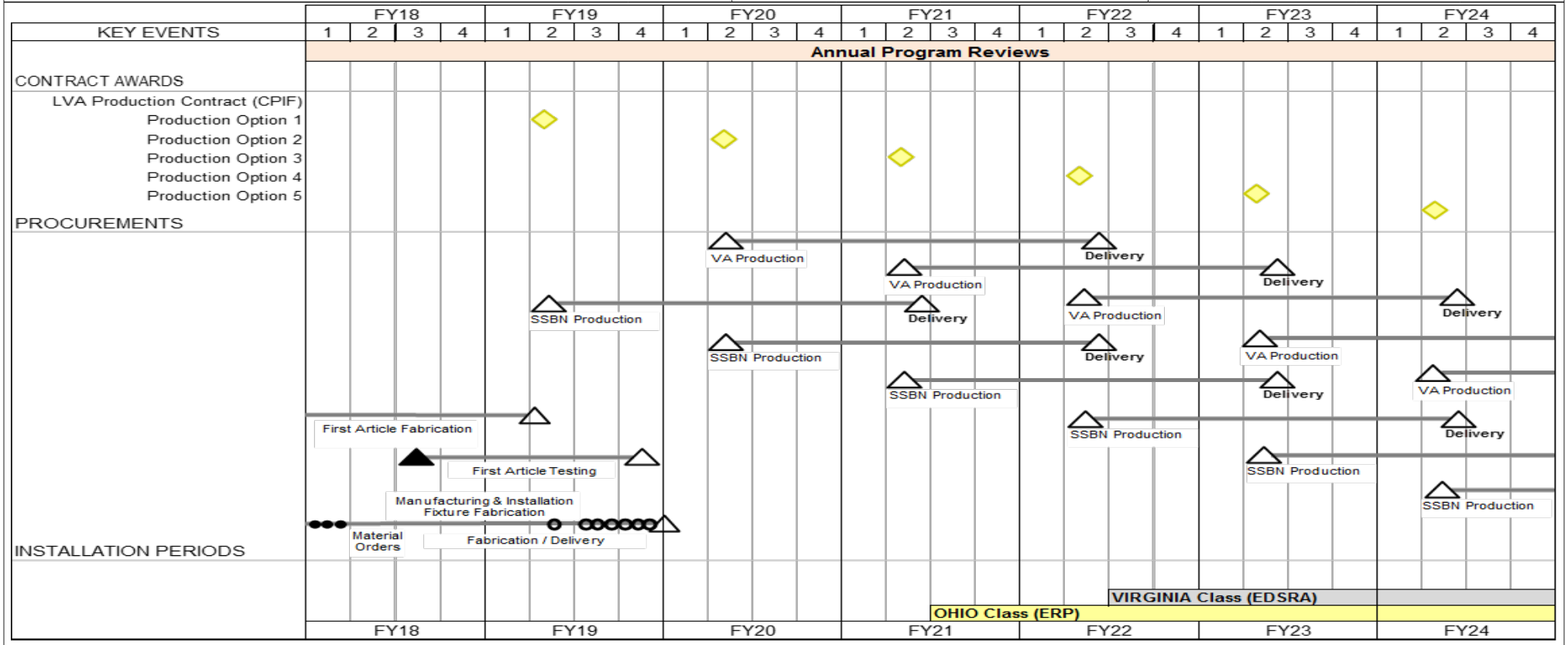
CAC: Common Acoustic Cabinet

OMS: Ownship Monitoring System

**SSN Installation Period**

**SSGN/SSBN Installation Period**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |




**KEY:**

- Completed Milestone
- Upcoming Milestone
- Production Option
- **SSN Installation Period**
- **SSBN Installation Period**

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0219 / *Sub Sonar Improvement (ENG)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0219*** | | | | |
| ACOUSTICS | 1 | 2018 | 3 | 2024 |
| ---Acquisition Milestones - Acoustics | 3 | 2018 | 3 | 2024 |
| ---Annual Program Reviews - Acoustics | 1 | 2018 | 4 | 2024 |
| ---Contract Awards - Acoustics | 1 | 2018 | 1 | 2022 |
| ---Procurements - Acoustics | 2 | 2018 | 2 | 2024 |
| ---DT/OT/FOT&E Tests | 1 | 2018 | 1 | 2024 |
| ---APB Deliveries | 3 | 2018 | 3 | 2024 |
| ---Tech Insertions | 1 | 2019 | 1 | 2023 |
| ---Installation Periods - Acoustics | 1 | 2018 | 4 | 2024 |
| LARGE VERTICAL ARRAY | 1 | 2018 | 4 | 2024 |
| ---Annual Program Reviews - Large Vertical Array | 1 | 2018 | 4 | 2024 |
| ---Contract Awards - Large Vertical Array | 2 | 2019 | 2 | 2024 |
| ---Procurements - Large Vertical Array | 2 | 2019 | 2 | 2024 |
| ---First Article Fabrication | 1 | 2018 | 2 | 2019 |
| ---First Article Testing | 3 | 2018 | 4 | 2019 |
| ---Material & Installation Fixture Fabrication | 1 | 2018 | 4 | 2019 |
| ---Installation Periods - Large Vertical Array | 3 | 2021 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0742: *Sub Integrated Ant System* | 310.884 | 15.267 | 15.426 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 341.577 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned out of PE 0604503N Project 0742, into PE 0604280N Project 0742 as part of RDTEN PE Consolidation starting in FY20.

**A. Mission Description and Budget Item Justification**

The programs funded under the Submarine Integrated Antenna System project (0742) provide Submarines with improved communications capabilities to support future Joint, Allied, and Naval operations. These efforts provide for the development and testing of submarine antennas and apertures designed to meet emerging submarine requirements (a) Increased antenna and aperture performance while operating at speed and depth, (b) Increased stealth capability of existing and future antennas and apertures, (c) Antenna and aperture compatibility with new waveforms and transceiver equipment, (d) Increased capabilities of antennas, apertures and their interface to the External Communications System, and (e) Improved antenna and aperture design to reduce Total Ownership Cost. Specifically, this project funds research and development for submarine antennas and apertures including (1) Transition Engineering, (2) Outboard Electronics (OE)-538/BRC Multi-Function Antenna, (3) OE-562 Submarine High Data Rate (SubHDR), (4) Advanced High Data Rate (AdvHDR) apertures, (5) Towed Buoy Antenna (TBA)(AN/BRR- 6/6B), and (6) Antenna Improvements.

The Transition Engineering program focuses on technology development and assessments to support Fourth Generation Undersea Warfare objectives and Undersea Communications with Optical Laser Frequencies (Under C-WOLF). Under C-WOLF is a Joint Capability Technology Demonstration (JCTD) program which provides lower latency communications between undersea platforms and will be managed as well.

The OE-538/BRC Multi-Function Antenna Program supports radio frequency communications from Very Low Frequency (VLF) to Ultra High Frequency (UHF) and provides Identification Friend and Foe (IFF), Global Positioning System (GPS), Mobile Users Objective System (MUOS), Tactical Data Link (TDL) via Link 16, and Iridium capabilities for all submarine classes across all submarine mission areas.

The SubHDR program provides the submarine fleet with EHF low data rate (LDR), EHF Medium Data Rate (MDR), EHF Extended data Rate (XDR), military Super High Frequency (SHF), and enables reception of the Global Broadcast Service (GBS).

The AdvHDR program develops communications methods that will improve undersea communications utilizing products developed by the Optical Communications Project Arrangement with the United Kingdom.

The Towed Buoy Antenna (TBA) AN/BRR-6/6B is installed on OHIO class submarines and a variant of AN/BRR-6 will be the TBA for COLUMBIA class.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

The Antenna Improvements project provides for Reliability, Maintainability and Availability (RMA) improvements and continued Preplanned Product Improvement (P3I) developments in support of current and future submarine antenna applications which includes OE-315, AN/BRA-24, ANBRA-6, AN/BRT-1 and AN/BRM -2

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Transition Engineering | 2.513 | 2.627 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue management of the Undersea Communications with Optical Laser Frequencies (Under C-WOLF) Joint Capabilty Technology Demonstration (JCTD) program which provides lower latency communications between undersea platforms.<br>- Continue concept engineering, new technology evaluations, and assessments in support of current and future Undersea Warfare.<br>- Continue development of future undersea communication capabilities in support of Fourth Generation Undersea Warfare.<br>- Continue development and integration of the Links of the Chain (LOTC) as a plug in for Virtual Worlds in support of simulation of the Undersea Architecture.<br>- Complete development of the Undersea Constellation Security Classification Guide (SCD).<br>- Complete development of Subsea and Seabed Warfare (SSW) Initial Capabilities Document (ICD).<br>- Complete Maritime Information System (MIS) Analysis of Alternatives (AoA).<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 0742 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 0742 | | | | | |
| ***Title:*** Outboard Electronics (OE)-538 | 0.200 | 0.100 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Complete development/update of required Full Rate Production (FRP) acquisition documents.<br>- Complete operational test (OT) on operational submarine in support of Full Rate Production (FRP). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Note: Due to submarine availability for OE-538A installation operational test (OT) was rescheduled from 3QFY17 to 1QFY19.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>- The $100K decrease from FY19 to FY20 is due to the completion of operational test (OT) and acquisition documentation for required Full Rate Production (FRP) Decision. | | | | | |
| ***Title:*** Submarine High Data Rate (SubHDR) Pre-Planned Product Improvement (P3I)<br>***Articles:***<br>***FY 2019 Plans:***<br>- Continue oversight of Reliability Maintainability, and Availability (RMA) components identified by research and analysis to maintain Ao throughout the life of the system.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 0742 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 0742 | 2.231<br>- | 0.253<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Advanced High Data Rate (AdvHDR)<br>***Articles:***<br>***FY 2019 Plans:***<br>- Continue Optical Communications (OCOMMS) Project Arrangement (PA) with United Kingdom.<br>- Continue development and integration of OCOMMS.<br>***FY 2020 Base Plans:*** | 3.323<br>- | 3.483<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY20 funding has been realigned to PE 0604280N Project 0742 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 0742 | | | | | |
| ***Title:*** Towed Buoy Antenna (AN/BRR-6/6B)<br>***Articles:***<br>***FY 2019 Plans:***<br>- Continue development for cybersecurity vulnerability detection and hardening.<br>- Continue design specification, component development, system integration, and testing for reliability improvements of radio frequency and depth canisters and buoy shape.<br>- Commence and complete at-sea integration testing for the buoy shape.<br>- Continue the development for BRR-6 Program on OHIO and COLUMBIA Class program, contract, logistics and system engineering management.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 0742 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 0742 | 3.589<br>- | 6.320<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Antenna Improvements<br>***Articles:***<br>***FY 2019 Plans:***<br>- Continue Pre-Planned Product Improvement (P3I) investigation and Reliability, Maintainability and Availability (RMA) development efforts for legacy antennas.<br>- Continue P3I investigation and RMA development efforts for AN/BRA-24. | 3.411<br>- | 2.643<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue development of the Transmit Receive Automatic Identification System (AIS) Amplifier Module (TRAAM) improvement to the OE-315 Buoyant Cable Assembly (BCA).<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 0742 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 0742 | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 15.267 | 15.426 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/3130: *Submarine Communication Equipment* | 76.327 | 78.580 | 69.643 | - | 69.643 | 62.380 | 65.201 | 65.927 | 67.081 | Continuing | Continuing |
| • 0604280N/0742: *Submarine Integrated Antenna System* | 0.000 | 0.000 | 18.925 | - | 18.925 | 16.152 | 15.680 | 13.943 | 14.219 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Continue antenna reliability improvements and fielding for SubHDR, Towed Buoy Antenna (TBA) (AN/BRR-6/6B), OE-315, OE-538 and other legacy antenna systems.

Program Milestones (MS):
Outboard Electronics (OE)-538: 2nd QTR FY19 Full Rate Production (FRP) Decision Review.

Buoy Antenna (TBA) (AN/BRR-6/6B): Details available at higher classification.

Test and Evaluation (T&E) Milestones:
OE-538: 1st QTR FY19 Operational Test (OT) for FRP.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

**E. Performance Metrics**

FY20 funding has been realigned to PE 0604280N Project 0742 as part of PE Consolidation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Future Capabilites (Trans Eng) | WR | SSC Pacific : San Diego, CA | 6.202 | 0.736 | Nov 2017 | 1.170 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 8.108 | - |
| Systems Engineering (Trans Eng) | Various | Available at higher classification : Available at higher classification | 2.521 | 0.545 | Nov 2017 | 0.251 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 3.317 | - |
| Systems Engineering (Trans Eng) | WR | NUWC : Newport, RI | 40.783 | 0.582 | Nov 2017 | 0.551 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 41.916 | - |
| Security Engineering (Trans Eng) | Various | Available at higher classification : Available at higher classification | 0.550 | 0.258 | Nov 2017 | 0.255 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.063 | - |
| JCTD Development (Trans Eng) | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Research and Analysis Reliability Dev (SubHDR) | WR | NUWC : Newport, RI | 7.341 | 0.806 | Nov 2017 | 0.253 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 8.400 | - |
| Research and Analysis Reliability Dev (SubHDR) | Various | Available at higher classification : Available at higher classification | 4.162 | 0.838 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.000 | - |
| OCOMMS PA Demonstration System Development (AdvHDR) | C/CPFF | TBD : TBD | 0.000 | 1.924 | Jul 2018 | 1.551 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.475 | - |
| Technology Development (AdvHDR) | C/CPFF | TBD : TBD | 0.000 | 0.250 | Jul 2018 | 0.312 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.562 | - |
| Systems Engineering (AdvHDR) | WR | SSC Pacific : San Diego, CA | 11.498 | 1.000 | Nov 2017 | 1.210 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 13.708 | - |
| Security Engineering/ Cybersecurity (BRR-6) | Various | Available at higher classification : Available at higher classification | 0.264 | 0.252 | Oct 2017 | 0.250 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.766 | - |
| Systems Engineering/ Hardware Dev (BRR-6) | WR | NSWC : Philadelphia, PA | 6.424 | 0.734 | Oct 2017 | 1.750 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 8.908 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering/ Hardware Dev (BRR-6) | WR | NUWC : Newport, RI | 3.797 | 0.641 | Oct 2017 | 0.499 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.937 | - |
| Systems Engineering/ Hardware Dev (BRR-6) | WR | NSWC : Carderock | 0.938 | 0.288 | Oct 2017 | 0.099 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.325 | - |
| Systems Engineering/ Hardware Dev (Antenna Improvements) | WR | NSWC : Philadelphia, PA | 2.270 | 1.500 | Nov 2017 | 0.959 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.729 | - |
| Systems Engineering/ Hardware Dev (Antenna Improvements) | WR | NSWC : Carderock | 0.125 | 0.130 | Nov 2017 | 0.135 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.390 | - |
| Systems Engineering/ Hardware Dev (Antenna Improvements) | WR | NUWC : Newport, RI | 0.000 | 1.556 | Nov 2017 | 1.424 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.980 | - |
| Product Development Prior Years | Various | Various : Various | 168.310 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 168.310 | - |
| Research and Analysis Reliability Dev (SubHDR) | Various | Available at higher classification- : Available at higher classification- | 5.149 | 0.167 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.316 | - |
| | | **Subtotal** | 260.334 | 12.207 | | 10.669 | | 0.000 | | - | | 0.000 | 0.000 | 283.210 | N/A |

**Remarks**

FY20 Cost data is provided under PE 0604280N Project 0742

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support (SubHDR) | Various | Available at higher classification : Available at higher classification | 0.432 | 0.090 | Nov 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.522 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cost Estimating (AdvHDR) | Various | Available at higher classification : Available at higher classification | 0.150 | 0.075 | Feb 2018 | 0.075 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| Integrated Logistics Support (AdvHDR) | Various | Available at higher classification : Available at higher classification | 0.150 | 0.075 | Feb 2018 | 0.080 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.305 | - |
| Cost Estimating (BRR-6) | Various | Available at higher classification : Available at higher classification | 0.109 | 0.000 | | 0.053 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.162 | - |
| Integrated logistics Support (BRR-6) | WR | NUWC : Newport, RI | 0.211 | 0.116 | Oct 2017 | 0.134 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.461 | - |
| Configuration Management (BRR-6) | WR | NSWC : Philadelphia, PA | 0.644 | 0.303 | Oct 2017 | 0.054 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.001 | - |
| Systems Engineering Support (BRR-6) | Various | Available at higher classification : Available at higher classification | 0.000 | 0.000 | | 0.060 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.060 | - |
| Integrated Logistics Support (Antenna Improvements) | Various | Available at higher classification : Available at higher classification | 0.050 | 0.050 | Nov 2017 | 0.050 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| Support Prior Years | Various | Various : Various | 8.609 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.609 | - |
| | | **Subtotal** | 10.355 | 0.709 | | 0.506 | | 0.000 | | - | | 0.000 | 0.000 | 11.570 | N/A |

**Remarks**

FY20 Cost data is provided under PE 0604280N Project 0742

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental/ Operational T&E (OE-538) | WR | NUWC : Newport, RI | 8.239 | 0.050 | Nov 2017 | 0.050 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 8.339 | - |
| Test & Evaluation (OE-538) | WR | COTF : Norfolk, VA | 1.374 | 0.150 | Nov 2017 | 0.050 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.574 | - |
| Test & Evaluation (SubHDR) | WR | NUWC : Newport, RI | 3.058 | 0.164 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.222 | - |
| Integration, Assembly & Test (BRR-6) | WR | NSWC : Philadelphia, PA | 0.130 | 0.283 | Oct 2017 | 0.919 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.332 | - |
| Integration, Assembly & Test (BRR-6) | WR | NSWC : Carderock | 0.099 | 0.481 | Oct 2017 | 1.384 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.964 | - |
| Integration, Assembly & Test (BRR-6) | WR | NUWC : Newport, RI | 0.219 | 0.241 | Oct 2017 | 0.180 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.640 | - |
| Integration, Assembly & Test (BRR-6) | WR | SSC Pacific : San Diego, CA | 0.000 | 0.000 | | 0.300 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| Test and Evaluation Prior Years | Various | Various : Various | 5.247 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.247 | - |
| | | **Subtotal** | 18.366 | 1.369 | | 2.883 | | 0.000 | | - | | 0.000 | 0.000 | 22.618 | N/A |

**Remarks**

FY20 Cost data is provided under PE 0604280N Project 0742

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support (Trans Eng) | Various | Available at higher classification : Available at higher classification | 4.561 | 0.392 | Feb 2018 | 0.400 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 5.353 | - |
| Program Management Support (SubHDR) | Various | Available at higher classification : Available at higher classification | 4.262 | 0.166 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.428 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support (AdvHDR) | Various | Available at higher classification : Available at higher classification | 8.031 | 0.249 | Feb 2018 | 0.255 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 8.535 | - |
| Program Management Support (BRR-6) | Various | Available at higher classification : Available at higher classification | 0.292 | 0.000 | | 0.638 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.930 | - |
| Program Management Support (Antenna Improvements) | Various | Available at higher classification : Available at higher classification | 0.075 | 0.175 | Feb 2018 | 0.075 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.325 | - |
| Management Services Prior Years | Various | Various : Various | 4.608 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.608 | - |
| | | **Subtotal** | 21.829 | 0.982 | | 1.368 | | 0.000 | | - | | 0.000 | 0.000 | 24.179 | N/A |

**Remarks**

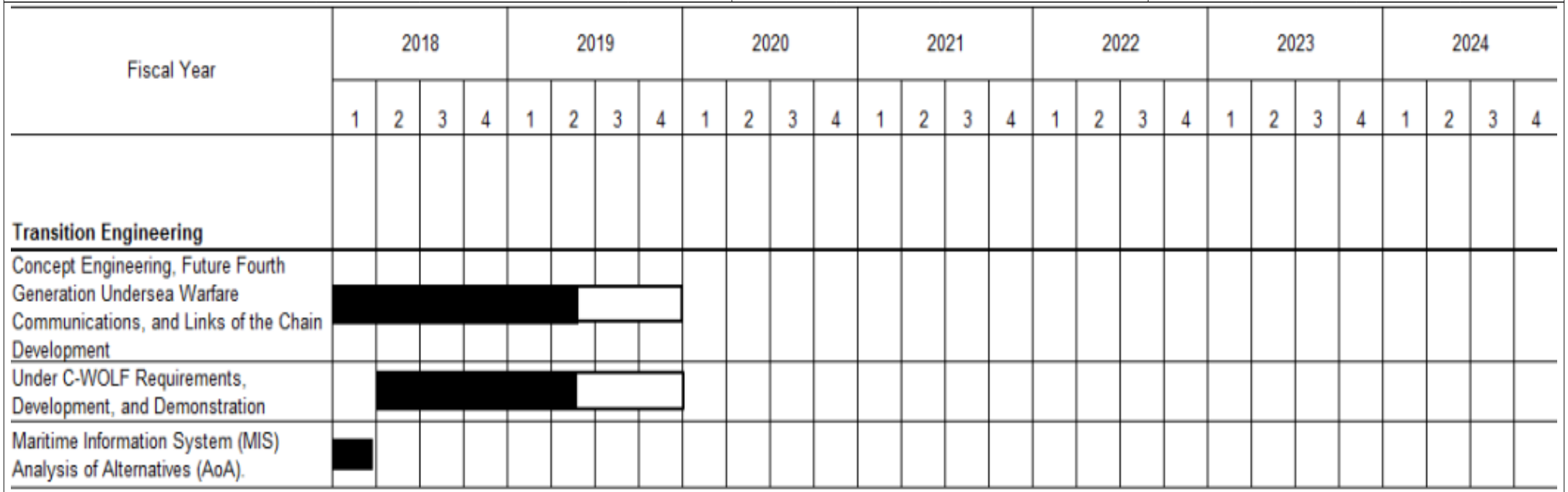
FY20 Cost data is provided under PE 0604280N Project 0742

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 310.884 | 15.267 | | 15.426 | | 0.000 | | - | | 0.000 | 0.000 | 341.577 | N/A |

**Remarks**

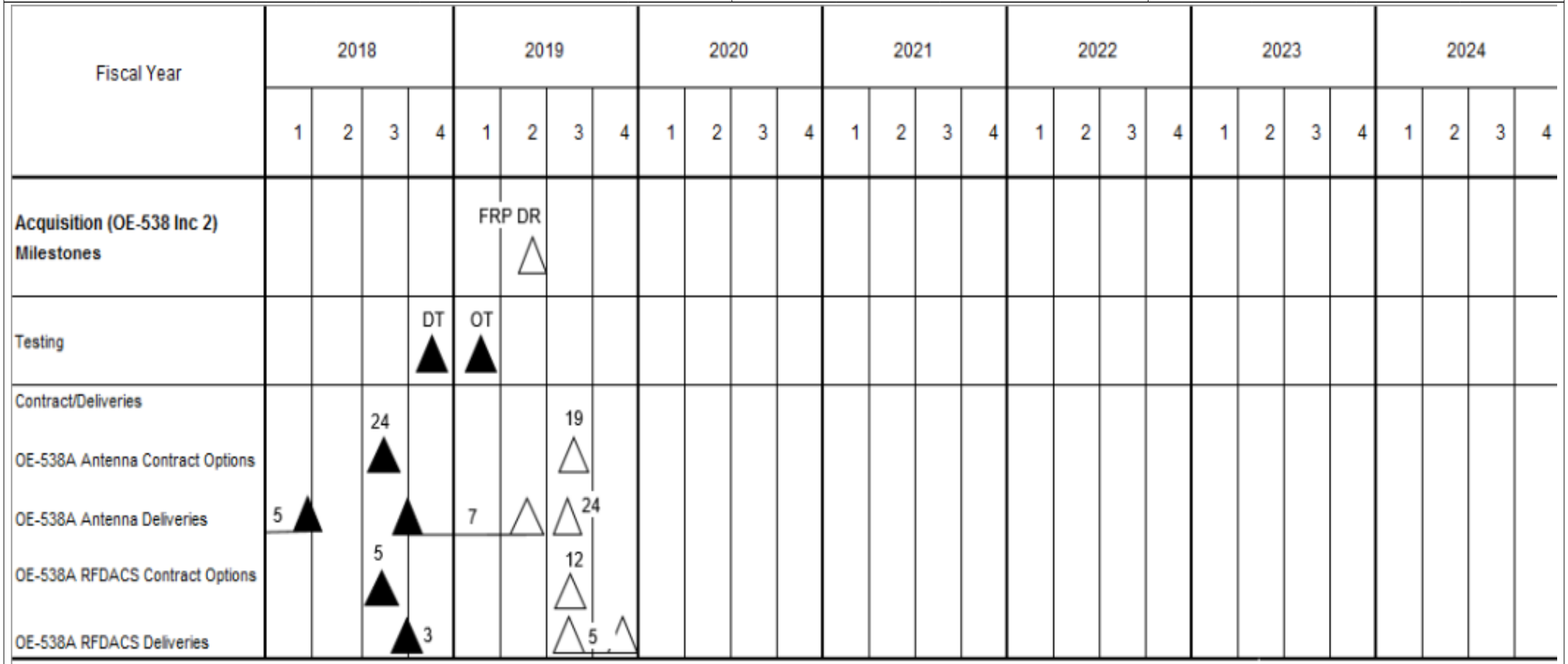
FY20 Cost data is provided under PE 0604280N Project 0742

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |



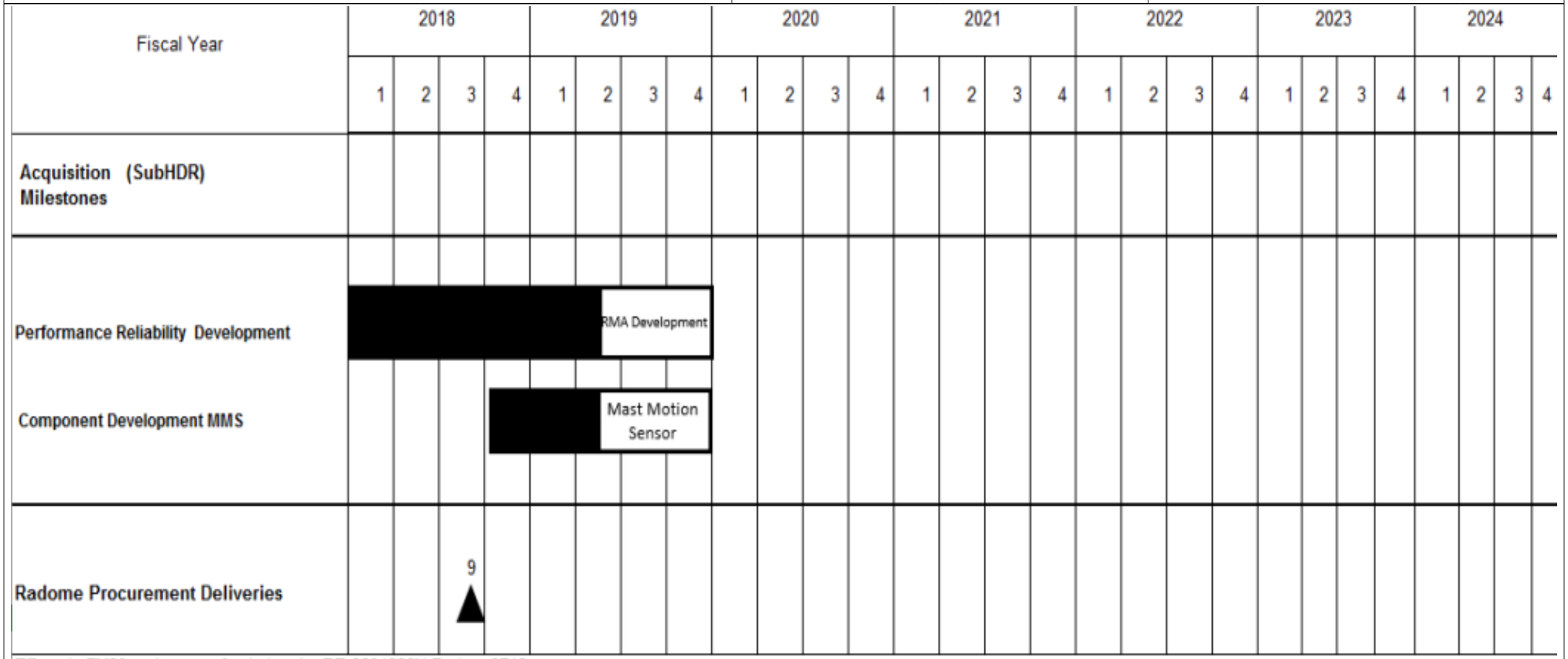

Note:
- Efforts in FY20 and out are funded under PE 0604280N Project 0742

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |



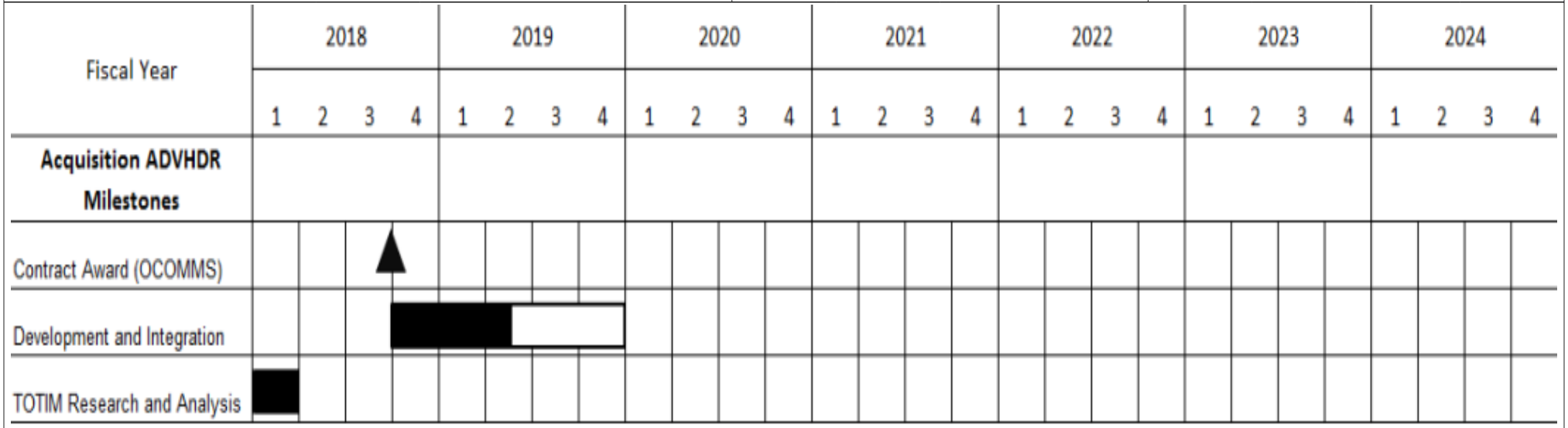

ACRONYMS:
DT - Developmental Test
OT - Operational Test
DR - Decision Review

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |



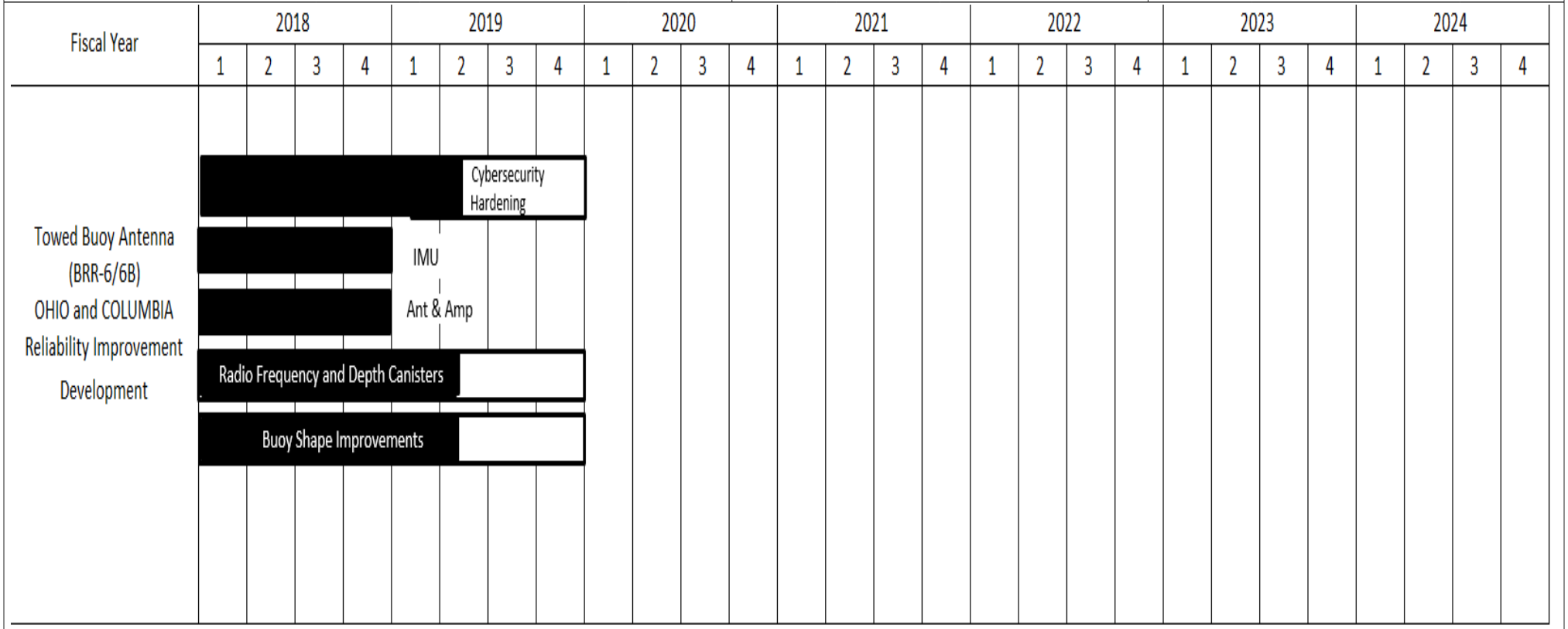

Efforts in FY20 and out are funded under PE 0604280N Project 0742

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |




Note:
- Optical Communications (OCOMMS) Project Arrangement (PA) is an international agreement with the United Kingdom.
- Efforts in FY20 and out are funded under PE 0604280N Project 0742

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |



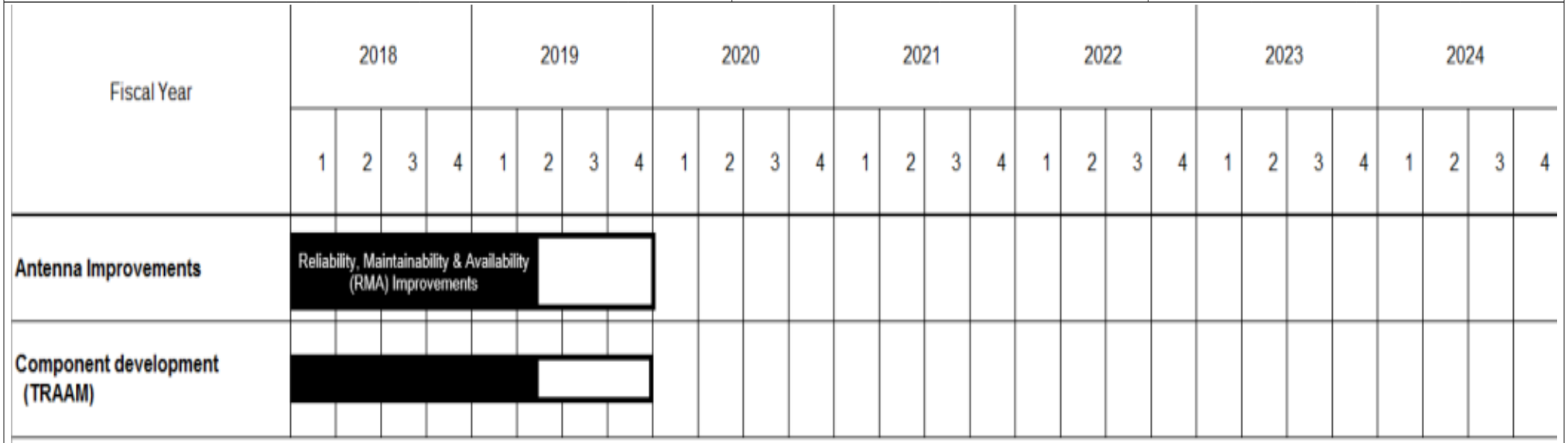

Efforts in FY20 and out are funded under PE 0604280N Project 0742

Additional details available at higher classification

IMU = Inertial Measurement Unit Implementation

Ant & Amp = Antenna and Amplifier Improvements

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0742 / *Sub Integrated Ant System* | |




Efforts in FY20 and out are funded under PE 0604280N Project 0742

Transmit Receive Automatic Identification System (AIS) Amplifier Module (TRAAM)

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0742*** | | | | |
| Transition Engineering Concept Engineering, Future Fourth Generation Undersea Warfare Communications, and Links of the Chain (LOC) Development | 1 | 2018 | 4 | 2019 |
| Transition Engineering Under C-WOLF Requirements, Development, and Demonstration | 2 | 2018 | 4 | 2019 |
| Transition Engineering Maritime Information System (MIS) Analysis of Alternatives (AoA) | 1 | 2018 | 1 | 2018 |
| OE-538A Full Rate Production Decision Review (FRP DR) | 2 | 2019 | 2 | 2019 |
| OE-538A Development Test (DT) for FRP | 4 | 2018 | 4 | 2018 |
| OE-538A Operational Test (OT) | 1 | 2019 | 1 | 2019 |
| OE-538A Antenna Deliveries Year 2 | 1 | 2018 | 2 | 2018 |
| OE-538A Antenna Deliveries Year 3 | 3 | 2018 | 2 | 2019 |
| OE-538A Antenna Contract Option Year 4 | 3 | 2018 | 3 | 2018 |
| OE-538A Antenna Deliveries Year 4 | 3 | 2019 | 4 | 2019 |
| OE-538A Antenna Contract Option Year 5 | 3 | 2019 | 3 | 2019 |
| OE-538A RFDACS Deliveries Year 1 | 3 | 2018 | 4 | 2018 |
| OE-538A RFDACS Contract Option Year 2 | 3 | 2018 | 3 | 2018 |
| OE-538A RFDACS Deliveries Year 2 | 3 | 2019 | 4 | 2019 |
| OE-538A RFDACS Contract Option Year 3 | 3 | 2019 | 3 | 2019 |
| OE-538A RFDACS Contract Option Year 4 | 3 | 2020 | 3 | 2020 |
| SubHDR Performance Reliability Component Development/Test | 1 | 2018 | 4 | 2019 |
| SubHDR Mast Motion Sensor | 4 | 2018 | 4 | 2019 |
| SubHDR Radome Production Deliveries | 3 | 2018 | 3 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0742 / *Sub Integrated Ant System* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| AdvHDR Contract Award Optical Communications (OCOMMS) | 3 | 2018 | 3 | 2018 |
| AdvHDR Development and Integration (OCOMMS) | 4 | 2018 | 4 | 2019 |
| AdvHDR TOTIM Reseach and Analysis | 1 | 2018 | 1 | 2018 |
| TBA (AN/BRR-6/6B) reliability improvement development: Cybersecurity Hardening | 1 | 2018 | 4 | 2019 |
| TBA (AN/BRR-6/6B) reliability improvement development: Inertial Measurement Unit (IMU) Implementation | 1 | 2018 | 4 | 2018 |
| TBA (AN/BRR-6/6B) reliability improvement development: Antenna and Amplifier Improvements | 1 | 2018 | 4 | 2018 |
| TBA (AN/BRR-6/6B) reliability improvement development: Radio Frequency and Depth Canisters | 1 | 2018 | 4 | 2019 |
| TBA (AN/BRR-6/6B) Buoy Shape Improvements | 1 | 2018 | 4 | 2019 |
| Antenna Improvements Reliability, Maintainability & Availability (RMA) Development | 1 | 2018 | 4 | 2019 |
| Antenna Improvemnts Component development (TRAAM) | 1 | 2018 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>0775 / *Submarine Supt Equip Prog* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0775: *Submarine Supt Equip Prog* | 27.733 | 9.082 | 28.408 | 27.273 | - | 27.273 | 19.902 | 30.232 | 33.266 | 32.853 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Submarine Support Equipment Program (SSEP) is responsible for the development and improvement of submarine Electronic Warfare (EW) systems in support of effective operations in the following mission areas: Joint Littoral Warfare; Joint Intelligence Surveillance Reconnaissance (ISR), Indications and Warnings; Electronic Warfare; Information Operations including Cyber; and Special Operations Force (SOF) support. The rapid proliferation of complex radar, communications and navigation equipment available to potential adversaries creates an increasingly dense and sophisticated electromagnetic environment. Sustained and significant improvements to submarine EW systems are required to maintain tactical ship safety and operational effectiveness. As such, EW was raised to a submarine primary mission area in FY2012 by Commander Submarine Forces, and EW is listed as the number one modernization requirement by the Submarine Tactical Requirements Group (STRG).

The FY 20 budget has increased from PB 19 submission to include funding for acceleration of digital technology into future EW Technical Insertions (TIs). This includes a $7.1M realignment from OPN (BLI 0840) to RDT&E. The FY 20 budget continues to develop Gen 2 of the Multifunction Modular Mast (MMM) payload, completes Advanced Processor Build 19 (APB-19) development and commences APB-21, supports developmental and operational test events, and completes development of the AN/BLQ-lOB Technical Insertion (TI-20) system, as well as transitions technologies from the Advanced Submarine Support Equipment Program (ASSEP) and Future Naval Capability (FNC) efforts.

- TI-22 provides the same critical update to 688i and SEAWOLF class ships as TI-20 provided to the VA Class. Additionally, TI-22 looks to improve the high-speed network and signal distribution systems developed in TI-20 as well as integrate new generations of EW Payloads. Funding is critical to developing enabling technologies that will provide maximized electronic spectrum digitization and processing, allowing Submarine EW system to continue to pace the threat. The EW environment is increasingly complex and crowded. The paradigms, algorithms, and analogue systems the Navy has relied on for decades are no longer able to maintain tactical relevance in the digital era of low power radars with digital waveforms. Tactical decision makers are unable to maintain awareness of the EW spectrum with current systems. Without significant investment in TI-22, the Submarine Navy will not be able to maintain littoral presence, conduct Anti-Access Area Denial operations, coordinated strike operations, joint ISR, and SOF support.

- The MMM Payload will be developed in three successive generations adding capability to pace the threat. The first generation provides Unmanned Aerial Systems (UAS) capability. The second generation is planned to add Tactical Data Link (TDL) Communications to the UAS mission. The third generation will add Coherent Electronic Attack (CEAS) and improve the ranges and reliability of previous Gen 1 and Gen 2 mission sets. With concurrence of the warfighting stakeholders, funding for MMM Payload development has been reduced from FY 19 to FY 20 to provide more funding to TI development and integration efforts.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |

- APB-19 brings three capabilities to the AN/BLQ-10 system: improved RADAR Direction Finding (DF) capability (688i/SSGN), improved Low Probability of intercept performance (LPI), and RADAR Vulnerability and Assessment Tools (RVAT). APB-21 brings improved RADAR Direction Finding (DF) capability for VA Class submarines, further refinements to RVAT and LPI processing and capabilities, Passive Ranging and Targeting, and Organic/Non-Organic fusion.

- Transitioning technologies include (Scalable Integrated RF System for Undersea Platforms) SIRFSUP, Submarine Simultaneous Transmit and Receive (SUBSTAR) and Electronic Warfare Micro-Adaptive Trainer (EW MAT).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Submarine Support Equipment Program | 9.082 | 28.408 | 27.273 | 0.000 | 27.273 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-- The $19M increase in funding is to initiate TI-20 development, design, integration of previously developed TI-20 technologies and other Non-Recurring Engineering efforts with industry and procure initial development hardware including racks, cabling, RF simulators, downconverters, signal distribution modules, controls and display units, and initial integration hardware. This funding will support further digitization of the AN/BLQ-10 system with a completely new design removing stove-piped analogue subsystems and replacing them with digital components that allows for "spectrum as a service" usage. TI-20 funding is critical to developing enabling technologies that will provide maximized electronic spectrum digitization and processing, allowing Submarine EW system to continue to pace the threat. The EW environment is increasingly complex and crowded. The paradigms, algorithms, and analogue systems the Navy has relied on for decades are no longer able to maintain tactical relevance in the digital era of low power radars with digital waveforms. Tactical decision makers are unable to maintain awareness of the EW spectrum with current systems. Without significant investment in TI-20, the Submarine Navy will not be able to maintain littoral presence, conduct Anti-Access Area Denial operations, coordinated strike operations, joint ISR, and SOF support.<br><br>-- Commence integration of EW Payloads into the AN/BLQ-10 system to interface with the TI-20 system.<br><br>-- Commence development of a digital Early Warning Receiver as part of the TI-20 system.<br><br>-- Complete TI-16 developmental testing on the Server-Based Radar Narrow Band (SB-RNB) and EW portions of the Low-Profile Photonics Mast. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -- Update AN/BLQ-10 software baseline changes for SWFTS and NPES, SPR Resolution and Software Enhancement via the Advanced Processor Build (APB) process to fully utilize the new technology being fielded in TI-20 with broader spectrum digitization.<br><br>-- Continue development of TI-20 capabilities for MMM payload EW System, EW Server, DF improvements, and Communications Digital Aperture Correlation and Emitter improvements.<br><br>-- Develop advanced technology demonstrations for feasibility of systems capable of meeting later increments of AN/BLQ-10 for performance and digital data delivery.<br><br>-- Conduct testing for MMM Payload, SLD buoy, improvements to emitter algorithms and improvements to correlation algorithms, improvements to vulnerability assessment algorithms. Tests include side by side laboratory testing, at sea testing (inclusive of TEMPALT development and crew training), fleet experimentation coordination and support, and technology demonstrations.<br><br>-- Update the MMM Payload to meet emerging Fleet needs and integrate into the AN/BLQ-10 system and combine Gen 1 MMM Payload capabilities with TDL communications capabilities.<br>***FY 2020 Base Plans:***<br>-- Continue TI-20 development, design, integration, configuration, architecture documentation and software design.<br><br>-- Complete MMM Payload Gen 2 development efforts including Tactical Data Link Comms.<br><br>-- Complete APB-19 development.<br><br>-- Finalize plans for APB-21 and commence development.<br><br>-- Update AN/BLQ-10 software baseline changes for SWFTS and NPES, SPR Resolution and Software Enhancement via the APB process to fully utilize the new technology being fielded in TI-20 with broader spectrum digitization. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -- Coordinate with ONR and NUWC Newport to develop FNC capabilities to a high technology readiness level and transition to EW systems as appropriate.<br><br>-- Develop advanced technology demonstrations for feasibility of systems capable of meeting later increments of AN/ BLQ-10 for performance and digital data delivery.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The SSEP budget decreases by $1.135M from FY 2019 to FY 2020 due to lower amounts of funding required for development and testing of MMM payloads in FY20 compared to FY19. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.082 | 28.408 | 27.273 | 0.000 | 27.273 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *VIRGINIA Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • RDT&E/0604558N: *New Design SSN* | 117.887 | 180.233 | 121.010 | - | 121.010 | 201.638 | 248.406 | 277.648 | 283.190 | Continuing | Continuing |
| • RDT&E/0603562N/0770: *Adv Sub Supp Equip Prog* | 4.120 | 4.307 | 4.557 | - | 4.557 | 4.718 | 4.822 | 4.908 | 5.004 | Continuing | Continuing |
| • OPN/0840: *Sub Periscope, Imaging and Supt Equip Prog* | 172.740 | 176.621 | 160.803 | - | 160.803 | 210.461 | 280.369 | 289.212 | 290.378 | Continuing | Continuing |
| • RDT&E/0603595N: *SSBN New Design* | 775.624 | 542.846 | 419.051 | - | 419.051 | 313.582 | 196.261 | 171.766 | 187.173 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

AN/BLQ-10 EW System - Procurements are executed/managed in accordance with Acquisition Plan (Rev 10) for AN/BLQ-10 EW System dtd 02/01/17, Single Acquisition Management Plan dtd 06/12/14, Individual Streamlined Acquisition Plan (Rev 0) for AN/BLQ-10dtd 04/09/18, and the AN/BLQ-10 Acquisition Strategy dtd 01/28/13.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |

**E. Performance Metrics**

The Research, Development and Demonstration (RDD) program goal is to respond to urgent operational needs within 30 days and provide for rapid development and fielding of prototype solutions within 270 days.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware and Software Development | Various | Various : Various | 2.500 | 1.323 | Oct 2017 | 1.349 | Oct 2018 | 0.679 | Oct 2019 | - | | 0.679 | Continuing | Continuing | Continuing |
| Hardware and Software Development | WR | NUWC : Newport, RI | 16.630 | 1.423 | Oct 2017 | 1.451 | Oct 2018 | 0.782 | Oct 2019 | - | | 0.782 | Continuing | Continuing | Continuing |
| Hardware and S/W Development MMM Payload | C/FFP | SEACORP : Newport, RI | 0.000 | 3.000 | Oct 2017 | 3.570 | Oct 2018 | 1.123 | Oct 2019 | - | | 1.123 | Continuing | Continuing | Continuing |
| Hardware and S/W Development TI-20/TI-22 | C/CPIF | Competitive: : TBD | 0.000 | 0.000 | | 18.561 | Oct 2018 | 22.799 | Oct 2019 | - | | 22.799 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 19.130 | 5.746 | | 24.931 | | 25.383 | | - | | 25.383 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

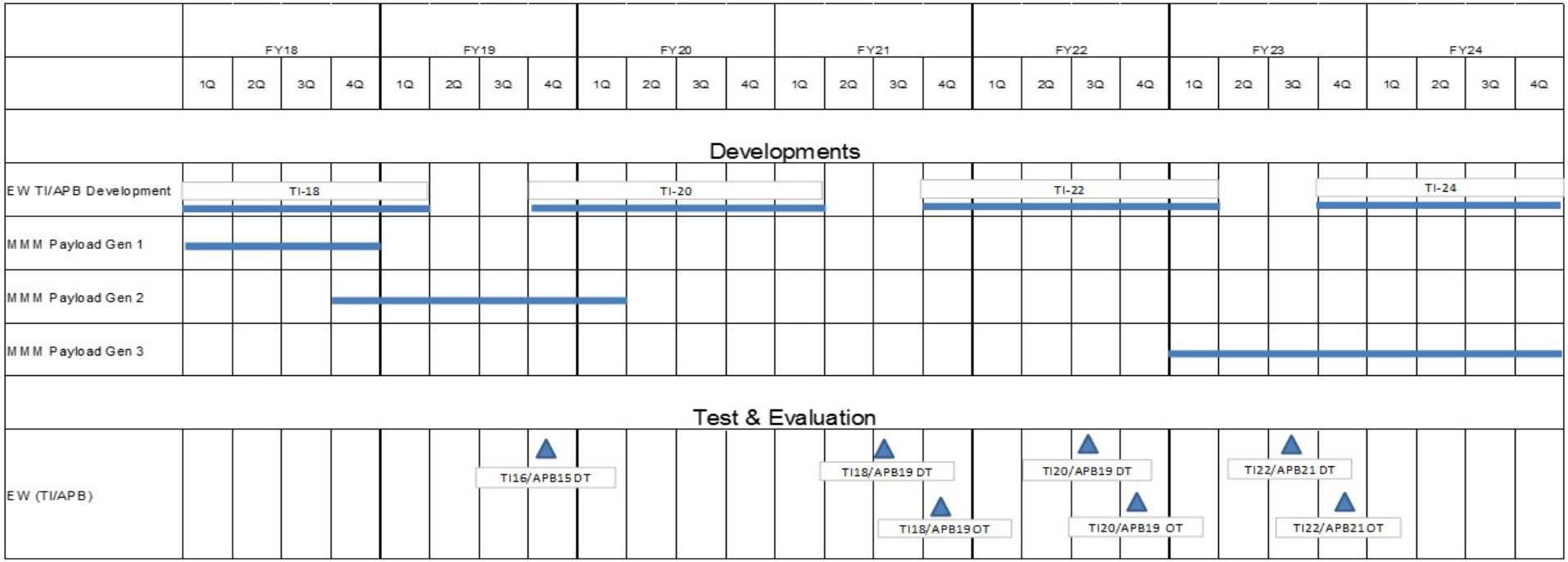
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Support | WR | COTF : Norfolk, VA | 0.789 | 0.275 | Oct 2017 | 0.320 | Oct 2018 | 0.330 | Oct 2019 | - | | 0.330 | Continuing | Continuing | Continuing |
| Systems Engineering & Test Support | WR | NUWC : Newport, RI | 7.814 | 3.061 | Oct 2017 | 3.157 | Oct 2018 | 1.560 | Oct 2019 | - | | 1.560 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.603 | 3.336 | | 3.477 | | 1.890 | | - | | 1.890 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 27.733 | 9.082 | | 28.408 | | 27.273 | | - | | 27.273 | Continuing | Continuing | N/A |

**Remarks**

The SSEP budget decreases by $1.135M from FY 2019 to FY 2020 due to lower amounts of funding required for development and testing of MMM payloads in FY20 compared to FY19.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>0775 / *Submarine Supt Equip Prog* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0775*** | | | | |
| Developments: EW TI/APB Development: TI-18 | 1 | 2018 | 1 | 2019 |
| Developments: EW TI/APB Development: TI-20 | 4 | 2019 | 1 | 2021 |
| Developments: EW TI/APB Development: TI-22 | 4 | 2021 | 1 | 2023 |
| Developments: EW TI/APB Development: TI-24 | 4 | 2023 | 4 | 2024 |
| Developments: MMM Payload Gen 1: | 1 | 2018 | 4 | 2018 |
| Developments: MMM Payload Gen 2: | 4 | 2018 | 1 | 2020 |
| Developments: MMM Payload Gen 3: | 1 | 2023 | 4 | 2024 |
| Test and Evaluation: TI-16/APB-15: Developmental Testing | 4 | 2019 | 4 | 2019 |
| Test and Evaluation: TI-18/APB-19: Developmental Testing | 2 | 2020 | 2 | 2020 |
| Test and Evaluation: TI-18/APB-19: Operational Testing | 4 | 2021 | 4 | 2021 |
| Test and Evaluation: TI-20/APB-19: Developmental Testing | 3 | 2022 | 3 | 2022 |
| Test and Evaluation: TI-20/APB-19: Operational Testing | 4 | 2022 | 4 | 2022 |
| Test and Evaluation: TI-22/APB-21: Developmental Testing | 3 | 2023 | 3 | 2023 |
| Test and Evaluation: TI-22/APB-21: Operational Testing | 4 | 2023 | 4 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | | | | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1411: *Sub Tact Comm System* | 228.337 | 14.443 | 16.068 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 258.848 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned out of PE 0604503N Project 1411, into PE 0604280N Project 1411 as part of RDTEN PE Consolidation starting in FY20.

**A. Mission Description and Budget Item Justification**

The Submarine Tactical Communications System budget item (1411) funds the Common Submarine Radio Room (CSRR) program, which provides a fully integrated and tested communications architecture of Command, Control, Communications, Computers, and Intelligence (C4I) program of record components, providing secure voice and data communications for all submarine classes. The CSRR program, via an end-to-end integrated test environment, ensures that submarine communications systems: (a) enhance assured information transfer via automated and integrated network management; (b) support assured command and control, (c) provide submarine Internet Protocol (IP) connectivity; (d) are interoperable with United States and allied/coalition military networks; (e) provide improved reliability, maintainability, and availability. The CSRR program includes the development of a network-controlled computer based trainer to support training requirements. The CSRR program provides systems engineering efforts associated with implementation of new technology allowing submarines to connect to the global information grid. The new technology will also ensure the submarine's continued ability to participate in network-centric warfare and exploit its inherent stealth capabilities in support of the Navy, Joint, and allied/coalition fight to achieve total battlespace information dominance. The CSRR program is authorized to field Increment 1 as multiple block upgrades (Versions). CSRR modernization activities bring new capabilities, address new requirements, resolve End-of-Life (EOL) and obsolescence issues or correct known system deficiencies. CSRR Increment 1 Version 4 enables critical submarine C4I capabilities (i.e., MUOS, Link-16, Iridium, GPS Anti-Jam, GPS M-Code) and addresses obsolescence and EOL issues of radio room infrastructure supporting critical Navy C4I systems (e.g., NMT, DMR, CANES, ADNS, SLVR).

Additional efforts funded under the Submarine Tactical Communications System budget item include (1) Undersea Platforms Special Communications, which provides fully integrated and tested Undersea Assured Command & Control (UAC2) communications systems; and (2) Link 16, which provides an enhanced submarine communication system by providing a two-way Tactical Data Link (TDL) processing capability on all classes of Submarines. The Link 16 program provides submarine Command & Control systems with Link 16 tactical network communications capabilities for situational awareness in a contested environment and is a key element in naval tactical networking. The new technology ensures the submarine's continued ability to participate in network-centric warfare and exploit its inherent stealth capabilities in support of the Navy, Joint, and allied/coalition fight to achieve total battlespace information dominance.

JUSTIFICATION FOR BUDGET ACTIVITY:
These programs are funded under ENGINEERING and MANUFACTURING DEVELOPMENT because they encompass development and demonstration of new end-items.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Common Submarine Radio Room (CSRR) | 10.978 | 10.616 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>CSRR Increment 1 Version 4 efforts:<br>- Complete systems engineering and development activities in support of modernization for the LOS ANGELES, OHIO-SSBN, OHIO-SSGN, VIRGINIA, and SEAWOLF Class submarines.<br>- Complete development of platform specific builds of Control and Management software for LOS ANGELES and VIRGINIA Class capabilities.<br>- Complete development of the Test and Evaluation Master Plan (TEMP) and all preparations for Developmental Test (DT) and Operational Test (OT) events.<br>- Complete implementation of security upgrades to meet Cybersecurity and multiple certification requirements for General Service (GENSER) and Sensitive Compartmented Information (SCI) for all CSRR platforms.<br>- Continue development of Multi-purpose Reconfigurable Training System (MRTS) software upgrade for LOS ANGELES, OHIO-SSBN, and OHIO-SSGN Class operator trainer and VIRGINIA Class maintenance trainer.<br>- Continue development of platform specific builds of Control and Management software for OHIO-SSBN, OHIO-SSGN, and SEAWOLF Class capabilities.<br>- Commence/Complete Critical Design Review.<br><br>CSRR Build 22 (previously Increment 1 Version 5) efforts:<br>- Commence systems engineering and development activities in support of modernization for the LOS ANGELES, OHIO-SSBN, OHIO-SSGN, COLUMBIA, VIRGINIA, and SEAWOLF Class submarines.<br>- Commence development of platform specific builds of Control and Management software for LOS ANGELES, OHIO-SSBN, OHIO-SSGN, COLUMBIA, VIRGINIA, and SEAWOLF Class capabilities.<br>- Commence implementation of security upgrades to meet Cybersecurity and multiple certification requirements for GENSER and SCI for all CSRR platforms.<br>- Commence Federal Information Security Management Act (FISMA) statutory requirement for Cybersecurity compliance of Cybersecurity deficiencies.<br><br>All CSRR Versions/Builds:<br>- Complete Environmental Qualification Testing (EQT) for CSRR Increment 1 Version 1 through Version 4.<br>- Complete FISMA statutory requirement for Cybersecurity compliance and correction of Increment 1 Version 1 through Version 4 Cybersecurity deficiencies. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue Supply Chain Risk Management (SCRM) assessment as part of Program Protection Plan (PPP) revision.<br>- Commence development of CSRR Increment 1 Version 1, 3, and 4 architecture model databases in support of implementing Model Based Systems Engineering (MBSE) for LOS ANGELES, OHIO-SSBN, OHIO-SSGN, COLUMBIA, VIRGINIA, and SEAWOLF Class submarines.<br>- Commence development of a reconfigurable Platform Integration and Test Laboratory.<br>- Commence updates to CSRR Acquisition documentation to reflect implementation of CSRR Build Process.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 1411 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 1411 | | | | | |
| ***Title:*** Undersea Assured Command & Control (UAC2) | 2.496 | 1.973 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Complete UAC2 Phase 2 Trade Study Development.<br>- Continue UAC2 technology development Phase 1 (solutions 1 and 2).<br>- Continue shore integration of UAC2 solution 1 to support DoD Teleports.<br>- Continue shore integration of UAC2 solution 1 to support DoN Submarine Broadcast Control Authority.<br>- Continue afloat integration of UAC2 solution 1 on all classes of submarines.<br>- Commence afloat integration of UAC2 solution 2 on all classes of submarines.<br>- Commence/complete Environmental Qualification Testing (EQT) on UAC2 Phase 1 solution 2.<br>***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 1411 as part of PE Consolidation<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 1411 | | | | | |
| ***Title:*** Link 16 | 0.969 | 3.479 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Commence systems engineering and development activities in support of Link 16 tactical network communications capability.<br>- Commence Lab integration of the Tactical Data Link (TDL) processor with Multifunctional Information Distribution System (MIDS) into the submarine architecture.<br>- Commence Environmental Qualification Testing (EQT).<br>- Commence Submarine radio room to combat system design, development, and integration.<br>- Commence updates to applicable Acquisition Documentation to support Link 16. | | | | | |
| ***FY 2020 Base Plans:***<br>FY20 funding has been realigned to PE 0604280N Project 1411 as part of PE Consolidation | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY20 justification and change explanation is provided under PE 0604280N Project 1411 | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 14.443 | 16.068 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/3130: *Submarine Communication Equipment* | 76.327 | 78.580 | 69.643 | - | 69.643 | 62.380 | 65.201 | 65.927 | 67.081 | Continuing | Continuing |
| • 0604280N/1411: *Submarine Tactical Communication System* | 0.000 | 0.000 | 14.175 | - | 14.175 | 12.977 | 14.372 | 14.674 | 14.963 | Continuing | Continuing |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

**D. Acquisition Strategy**

-CSRR Program Milestones: Increment 1 Version 4 Critical Design Review (CDR) 2Q FY19, Developmental Test (DT) 1Q FY20, Fielding Decision 2Q FY20 and Operational Test (OT) 3Q FY20. CSRR Build 22 PDR 3Q FY21, CDR 3Q FY22, DT 2Q FY23, OT 1Q FY24, and Fielding Decision 3Q FY23. CSRR Acquisition Strategy shifted to CSRR Builds (CB) post fielding of Increment 1 Version 4 to better align with the Navy's Submarine Warfare Federated Tactical Systems (SWFTS).

- UAC2 Program Milestones: Detailed information available at a higher classification.

-Link 16 Program Milestones: Developmental Test (DT) 1Q FY21, Operational Test (OT) 2Q FY21. Link 16 is a newly funded, existing requirement within CSRR. Tactical Data Links capability documented in the CSRR Capability Production Document (CPD).

**E. Performance Metrics**

FY20 funding has been realigned to PE 0604280N Project 1411 as part of PE Consolidation.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Multi-Purpose Reconfigurable Training System (MRTS) Development (CSRR) | WR | SSC LANT : Charleston, SC | 5.129 | 1.332 | Dec 2017 | 1.387 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 7.848 | - |
| Systems Eng/Design Increment 1 (CSRR) | WR | NUWC : Newport, RI | 17.933 | 4.665 | Dec 2017 | 4.675 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 27.273 | - |
| Site Platform Integration/ Certification (CSRR) | WR | NUWC : Newport, RI | 13.212 | 0.255 | Dec 2017 | 0.263 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 13.730 | - |
| Software Development (CSRR) | C/CPFF | TBD : TBD | 0.000 | 0.505 | Sep 2018 | 1.757 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.262 | - |
| Software Development (CSRR) | Various | Available at higher classification : Available at higher classification | 11.011 | 1.660 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.671 | - |
| Systems Eng/Integration (UAC2) | WR | NUWC : Newport, RI | 0.000 | 1.560 | Nov 2017 | 0.650 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.210 | - |
| Design (UAC2) | WR | SSC PAC : San Diego, CA | 0.000 | 0.200 | Nov 2017 | 0.350 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.550 | - |
| Hardware Development (Link 16) | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.500 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| Systems Engineering (Link 16) | WR | NUWC : Newport, RI | 0.000 | 0.497 | Nov 2017 | 1.300 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.797 | - |
| Site Platform integration/ Certification (Link 16) | WR | NUWC : Newport, RI | 0.000 | 0.353 | Nov 2017 | 0.980 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.333 | - |
| Software Development (Link 16) | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.421 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.421 | - |
| Product Development Prior Years | Various | Various : Various | 124.155 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 124.155 | - |
| | | **Subtotal** | 171.440 | 11.027 | | 12.283 | | 0.000 | | - | | 0.000 | 0.000 | 194.750 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604280N Project 1411

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support (CSRR) | WR | NUWC : Newport, RI | 4.148 | 0.290 | Nov 2017 | 0.296 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.734 | - |
| Software Engineering (CSRR) | WR | SSC PAC : San Diego, CA | 4.043 | 0.248 | Nov 2017 | 0.155 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.446 | - |
| Information Security/ Cyber Security (INFOSEC) Certification/Supply Chain Risk Management (SCRM) Assessment (CSRR) | Various | SSC PAC/SSC LANT/NUWC : San Diego, CA/ Charleston, SC/ Newport, RI/San Diego | 25.453 | 1.321 | Nov 2017 | 1.346 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 28.120 | - |
| Integrated Logistics Support (UAC2) | WR | NUWC : Newport, RI | 0.000 | 0.000 | | 0.250 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| Trade Study (UAC2) | Various | Available at higher classification : Available at higher classification | 0.000 | 0.075 | Jul 2018 | 0.500 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.575 | - |
| Integrated Logistics Support (Link 16) | WR | NUWC : Newport, RI | 0.000 | 0.000 | | 0.050 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Software Engineering (Link 16) | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.045 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.045 | - |
| | | **Subtotal** | 33.644 | 1.934 | | 2.642 | | 0.000 | | - | | 0.000 | 0.000 | 38.220 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604280N Project 1411

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental/ Operational Test and Evaluation (T&E) (CSRR) | WR | COTF, JITC : Various | 11.285 | 0.060 | Nov 2017 | 0.090 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 11.435 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation (T&E) (UAC2) | WR | COTF, JITC : Various | 0.000 | 0.461 | Nov 2017 | 0.023 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.484 | - |
| Developmental/ Operational Test and Evaluation (T&E) (Link 16) | WR | COTF, JITC : Various | 0.000 | 0.000 | Nov 2017 | 0.030 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.030 | - |
| | | **Subtotal** | 11.285 | 0.521 | | 0.143 | | 0.000 | | - | | 0.000 | 0.000 | 11.949 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604280N Project 1411

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support (CSRR) | Various | Available at higher classification : Available at higher classification | 11.968 | 0.642 | Nov 2017 | 0.647 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 13.257 | - |
| Program Management Support (UAC2) | Various | Available at higher classification : Available at higher classification | 0.000 | 0.200 | Nov 2017 | 0.200 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| Program Management Support (Link 16) | Various | Available at higher classification : Available at higher classification | 0.000 | 0.119 | Nov 2017 | 0.153 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.272 | - |
| | | **Subtotal** | 11.968 | 0.961 | | 1.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.929 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604280N Project 1411

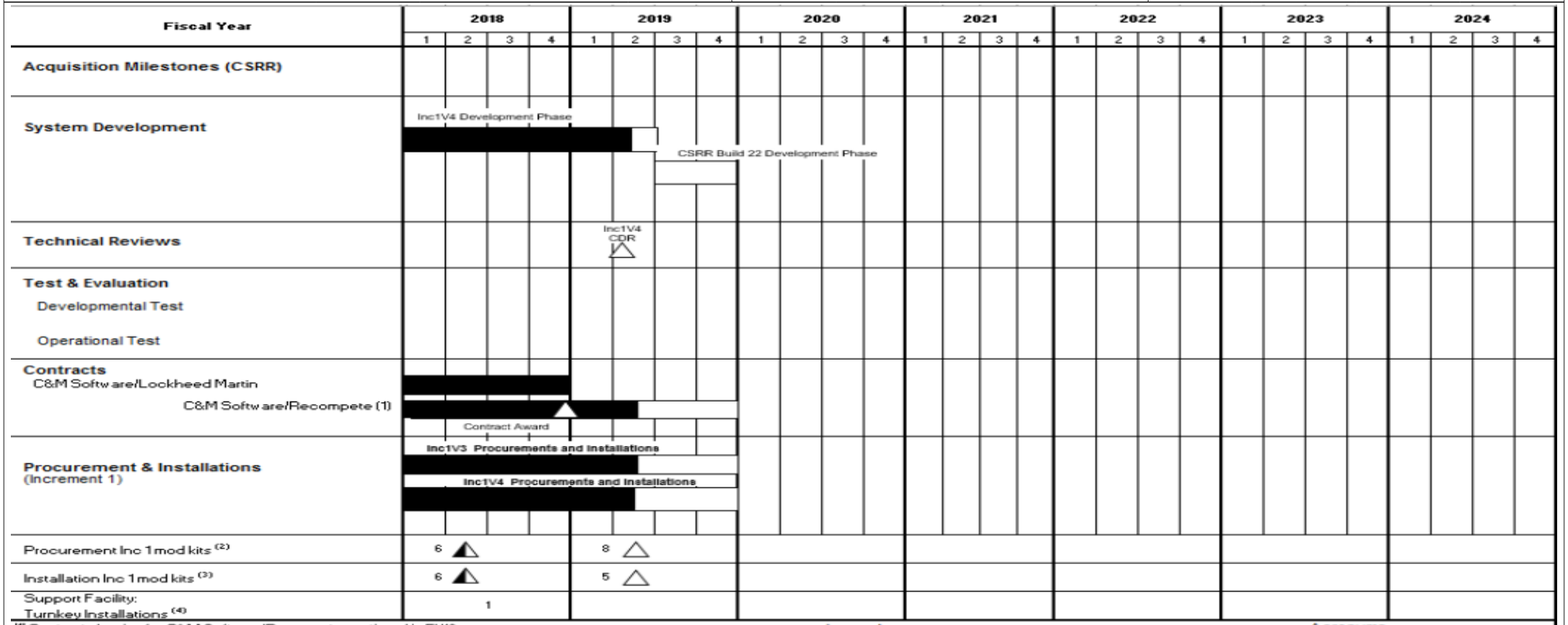
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>1411 / *Sub Tact Comm System* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 228.337 | 14.443 | | 16.068 | | 0.000 | | - | | 0.000 | 0.000 | 258.848 | N/A |

**Remarks**

FY20 cost data is provided under PE 0604280N Project 1411

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |




[1] Contract planning for C&M Software/Recompete continued in FY18.

[2] Due to Fleet rescheduling of availability periods, some procurements have been rescheduled.

[3] Due to Fleet rescheduling of availability periods, some installations have been rescheduled.

[4] Installation cost included in procurement (Turnkey) for version updates to 3 submarine class modernization reconfigurable lab assets.

Efforts in FY20 and out are under PE 0604280N Project 1411

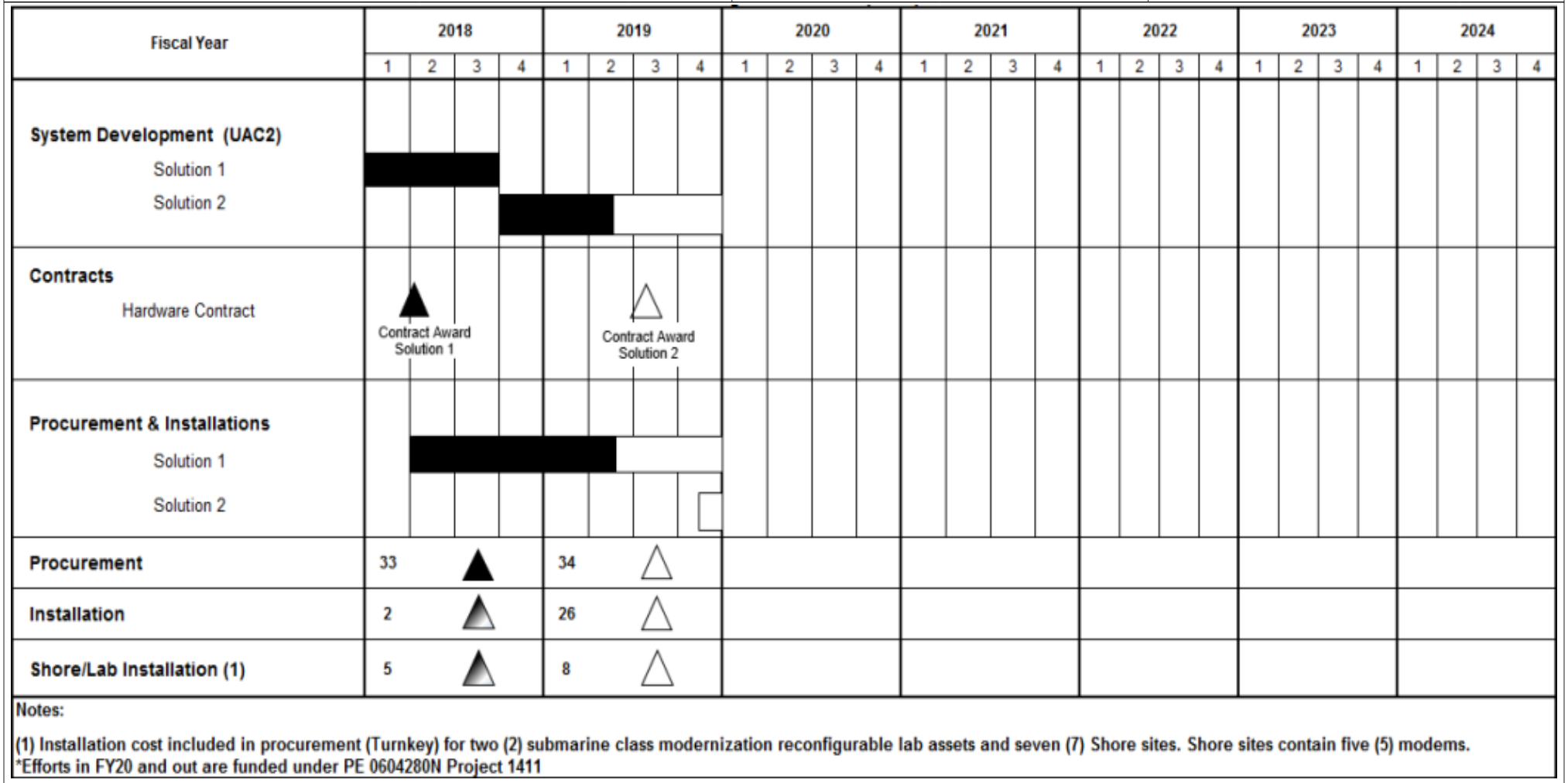
Legend

- Scheduled Event
- Completed Event
- Ongoing/Future Event
- Completed Phase of Ongoing Event

Acronyms

| | |
|---|---|
| Inc | Increment |
| V | Version |
| CDR | Critical Design Review |
| PDR | Preliminary Design Review |
| T&E | Test & Evaluation |
| DT | Developmental Test |
| OT | Operational Test |
| JITC | Joint Interoperability Test Command |
| C&M | Control & Management |

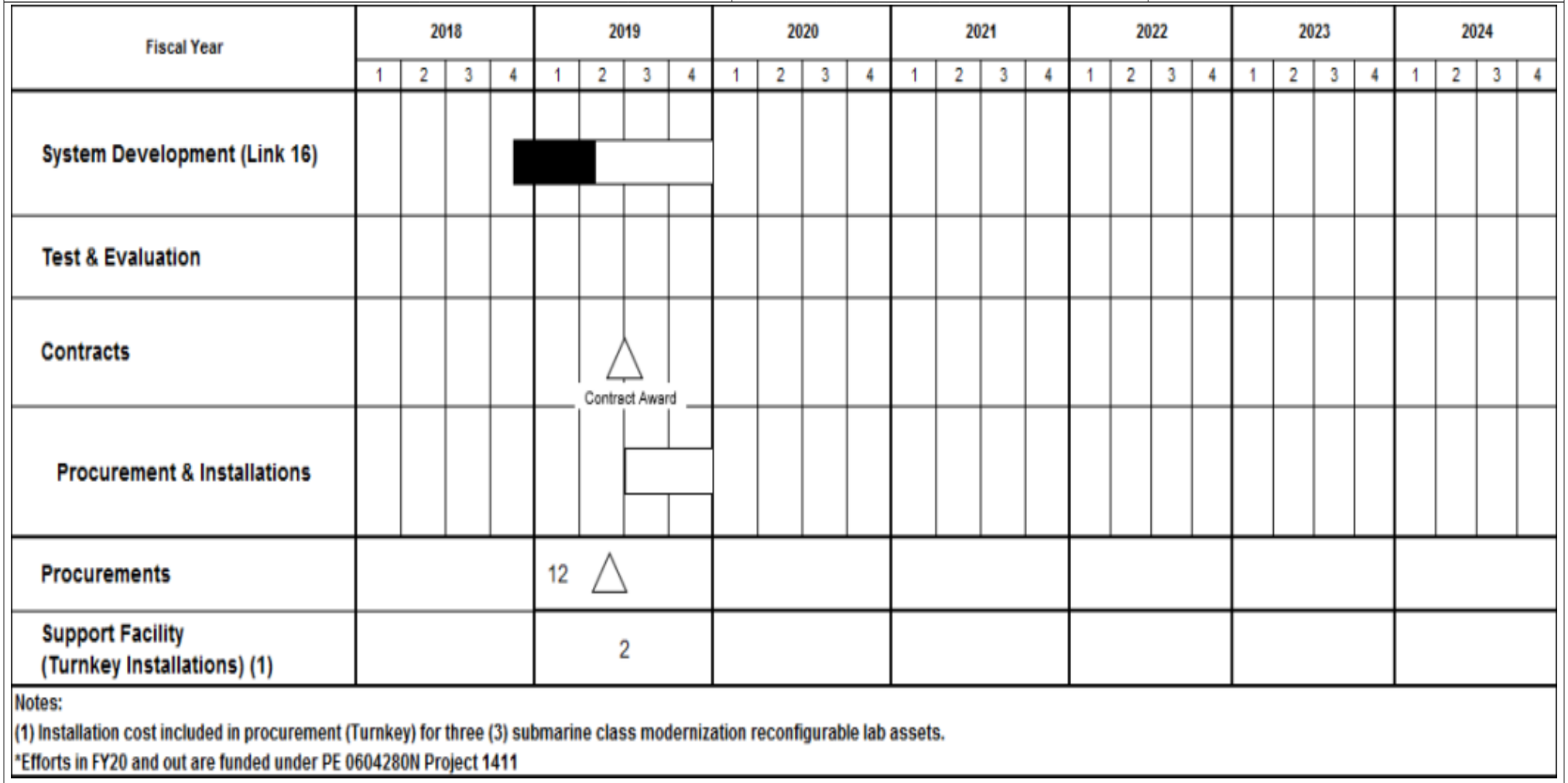
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |




Notes:

(1) Installation cost included in procurement (Turnkey) for two (2) submarine class modernization reconfigurable lab assets and seven (7) Shore sites. Shore sites contain five (5) modems.
*Efforts in FY20 and out are funded under PE 0604280N Project 1411

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |




Notes:
(1) Installation cost included in procurement (Turnkey) for three (3) submarine class modernization reconfigurable lab assets.
*Efforts in FY20 and out are funded under PE 0604280N Project 1411

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>1411 / *Sub Tact Comm System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1411*** | | | | |
| Technical Reviews (Increment 1 Version 4 Critical Design Review (CDR)) | 2 | 2019 | 2 | 2019 |
| System Development (Increment 1 Version 4) | 1 | 2018 | 2 | 2019 |
| System Development (CSRR Build 22) | 3 | 2019 | 4 | 2019 |
| Contracts (Software) | 1 | 2018 | 4 | 2018 |
| Contracts (Software-Follow-on to include planning) | 1 | 2018 | 4 | 2019 |
| Procurement/Installation (Increment 1 Version 3 Modernization Kits) | 1 | 2018 | 4 | 2019 |
| Procurement/Installation (Increment 1 Version 4 Modernization Kits) | 1 | 2018 | 4 | 2019 |
| System Development (Undersea Assured Command & Control (UAC2) Solution 1) | 1 | 2018 | 3 | 2018 |
| System Development (UAC2 Solution 2) | 4 | 2018 | 4 | 2019 |
| Contract Award (UAC2) Solution 1) | 2 | 2018 | 2 | 2018 |
| Contract Award (UAC2) Solution 2) | 3 | 2019 | 3 | 2019 |
| Procurement/Installation (UAC2) Solution 1) | 2 | 2018 | 4 | 2019 |
| Procurement/Installation (UAC2) Solution 2) | 4 | 2019 | 4 | 2019 |
| System Development (Link 16) | 4 | 2018 | 4 | 2019 |
| Procurement (Link 16) | 3 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604503N / *SSN-688 & Trident Modernization* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 6.770 | 19.301 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 26.071 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Submarine Support Equipment Program (SSEP) seeks to develop or transition from the Advanced Submarine Support Equipment Program (ASSEP) and Future Naval Capability (FNC) efforts to all Technical Insertions (TIs).

The SSEP is responsible for the development and improvement of submarine Electronic Warfare (EW) systems in support of effective operations in the following mission areas: Joint Littoral Warfare; Joint Intelligence Surveillance Reconnaissance (ISR), Indications and Warnings; Electronic Warfare; Information Operations including Cyber; and Special
Operations Force (SOF) support. The rapid proliferation of complex radar, communications and navigation equipment available to potential adversaries creates an increasingly dense and sophisticated electromagnetic environment. Sustained and significant improvements to submarine EW systems are required to maintain tactical ship safety and operational effectiveness. As such, EW was raised to a submarine primary mission area in FY2012 by Commander Submarine Forces, and EW is listed as the number one modernization requirement by the Submarine Tactical Requirements Group (STRG).

The RDTE funding line supports the development of capability improvements to submarine electronic surveillance measures that are used to detect, classify, localize, and record radar and communications signals. These enhancements would allow current technology to keep up with the advances in electronic warfare of our adversaries. The funding line also supports the specific development of AN/BLQ-10 EW capabilities to progress PMS435's efforts to provide maximized electronic spectrum digitization, Low Probability of Intercept (LPI)/ Low Probability of Detection (LPD) radars and Critical Event Recorder (CER) capability.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Program Increase | 19.301 | 0.000 |
| ***FY 2018 Accomplishments:*** Electronic Warfare Tactical TEMPALT: Developed the Electronic Warfare Tactical TEMPALT to provide capability improvements to submarine electronic surveillance measures that are used to detect, classify, localize, and record radar and communications signals.<br><br>Enhanced LPI and CER: Commenced development of an enhanced capability for detecting Low Probability of Intercept RADARs. Commenced development of a Critical Event Recorder capability to allow for recording information from the AN/BLQ-10 around a critical event similar to other Submarine Warfare Federated Tactical | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| Systems. These capabilities will be included in AN/BLQ-10 systems for all TI-18 and on TI-16 SEAWOLF systems when fielded.<br><br>***FY 2019 Plans:*** Electronic Warfare Tactical TEMPALT: Complete development of the Electronic Warfare Tactical TEMPALT to provide capability improvements to submarine electronic surveillance measures that are used to detect, classify, localize, and record radar and communications signals.<br><br>Enhanced LPI and CER: Complete development of an enhanced capability for detecting Low Probability of Intercept RADARs. Complete development of a Critical Event Recorder capability to allow for recording information from the AN/BLQ-10 around a critical event similar to other Submarine Warfare Federated Tactical Systems. These capabilities will be included in AN/BLQ-10 systems for all TI-18 and on TI-16 SEAWOLF systems when fielded. | | |
| **Congressional Adds Subtotals** | 19.301 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTE/0604503N/0775: *Submarine Supt Equip Prog* | 9.082 | 28.408 | 27.273 | - | 27.273 | 19.902 | 30.232 | 33.266 | 32.853 | Continuing | Continuing |
| • SCN/2013: *VIRGINIA Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • RDT&E/0604558N: *New Design SSN Combat Sys Development* | 117.887 | 180.233 | 121.010 | - | 121.010 | 201.638 | 248.406 | 277.648 | 283.190 | Continuing | Continuing |
| • OPN/0840: *Sub Periscope, Imaging and Supt Equip Prog* | 172.740 | 176.621 | 160.803 | - | 160.803 | 210.461 | 280.369 | 289.212 | 290.378 | Continuing | Continuing |
| • RDT&E/0603595N: *SSBN New Design* | 775.624 | 542.846 | 419.051 | - | 419.051 | 313.582 | 196.261 | 171.766 | 187.173 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**E. Performance Metrics**

The Research Development and Demonstration (RDD) program goal is to respond to urgent operational needs within 30 days and provide for rapid development and fielding of prototype solutions within 270 days.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H/W & S/W Development | WR | NUWC : Newport, RI | 0.524 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.524 | - |
| HW & SW Development | C/CPFF | Progeny : Manassas, VA | 5.801 | 18.112 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 23.913 | - |
| | | **Subtotal** | 6.325 | 18.112 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.437 | N/A |

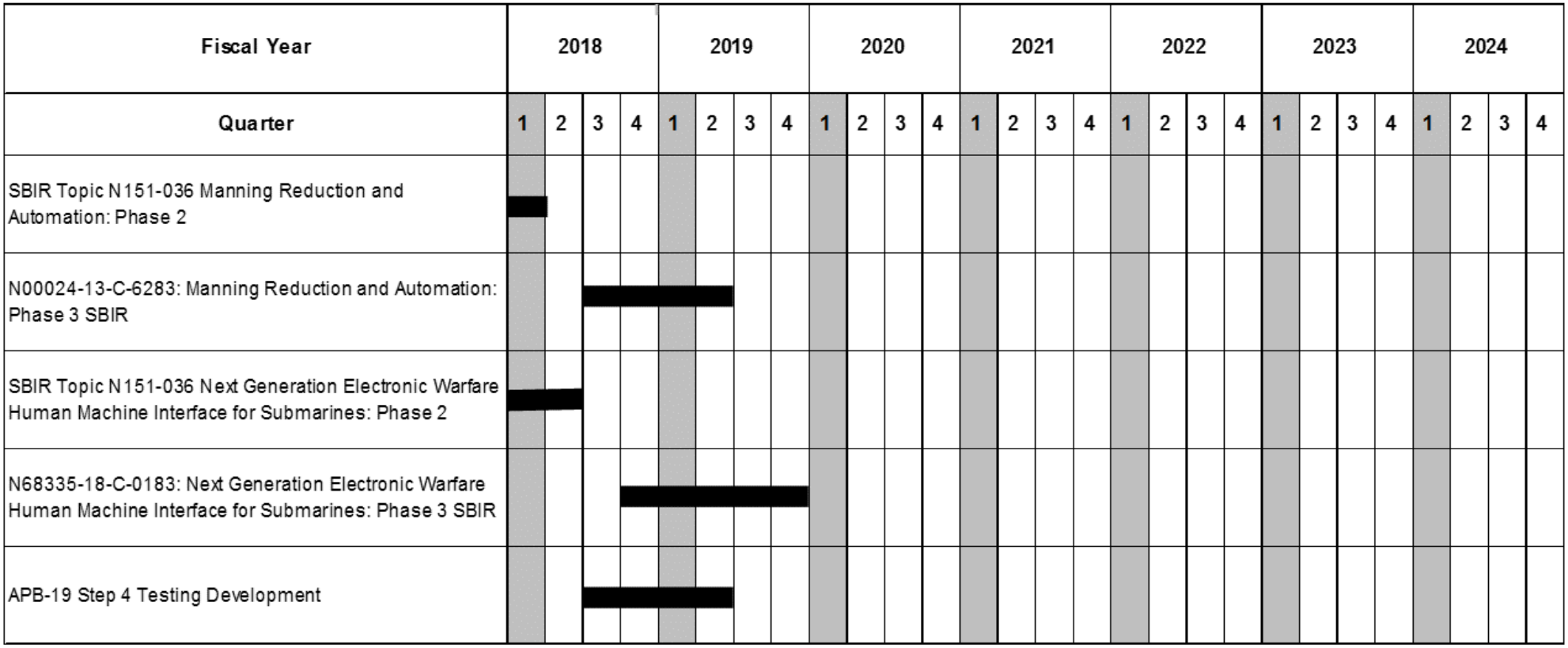
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering and Test Support | WR | NUWC : Newport, RI | 0.445 | 1.189 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.634 | - |
| | | **Subtotal** | 0.445 | 1.189 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.634 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 6.770 | 19.301 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 26.071 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604503N / *SSN-688 & Trident Modernization* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| AN/BLQ-10A EW Server Build: SBIR Topic N151-036 Manning Reduction and Automation: Phase 2 | 1 | 2018 | 1 | 2018 |
| AN/BLQ-10A EW Server Build: N00024-13-C-6283: Manning Reduction and Automation: Phase 3 SBIR | 3 | 2018 | 2 | 2019 |
| AN/BLQ-10A EW Server Build: SBIR Topic N151-036 Next Generation Electronic Warfare Human Machine Interface for Submarines: Phase 2 | 1 | 2018 | 2 | 2018 |
| AN/BLQ-10A EW Server Build: N68335-18-C-0183: Next Generation Electronic Warfare Human Machine Interface for Submarines: Phase 3 SBIR | 4 | 2018 | 4 | 2019 |
| AN/BLQ-10A EW Server Build: APB-19 Step 4 Testing Development | 3 | 2018 | 2 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604504N *I Air Control* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 189.158 | 68.012 | 61.498 | 44.923 | - | 44.923 | 36.844 | 30.084 | 29.309 | 29.890 | Continuing | Continuing |
| 0718: *MATCALS* | 8.749 | 5.100 | 5.488 | 6.648 | - | 6.648 | 3.111 | 2.642 | 2.683 | 2.736 | Continuing | Continuing |
| 0993: *Carrier ATC* | 137.564 | 34.301 | 33.679 | 15.522 | - | 15.522 | 11.735 | 10.033 | 7.992 | 8.151 | Continuing | Continuing |
| 1657: *ATC Improvement* | 3.828 | 0.411 | 0.419 | 0.416 | - | 0.416 | 0.424 | 0.435 | 0.443 | 0.451 | Continuing | Continuing |
| 3372: *ATC Systems* | 39.017 | 28.200 | 21.912 | 22.337 | - | 22.337 | 21.574 | 16.974 | 18.191 | 18.552 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This program element provides for the development, integration, and testing of Automated Air Traffic Control (ATC) hardware and software required to provide improved flight safety and more reliable all-weather ATC and landing system capabilities at Naval Air Stations (NASs) and Marine Corps Air Stations (MCASs) and Fleet Area Control and Surveillance Facilities (FACSFAC) worldwide. Programs are required to upgrade or replace aging ATC and landing system equipment on aircraft, aircraft carriers, amphibious ships, NASs, MCASs and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites. These upgrades include addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates. Virtual Warfare Center (VWC) supports the Marine Air Ground Task Force (MAGTF) Integrated Air and Missile Defense (IAMD) development.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 75.186 | 62.448 | 62.325 | - | 62.325 |
| Current President's Budget | 68.012 | 61.498 | 44.923 | - | 44.923 |
| Total Adjustments | -7.174 | -0.950 | -17.402 | - | -17.402 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -0.950 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -4.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -1.390 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -17.390 | - | -17.390 |
| • Rate/Misc Adjustments | -0.001 | 0.000 | -0.012 | - | -0.012 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604504N *I Air Control* | | | |
| • Congressional Directed Reductions | -1.783 | - | - | - | - |
| Adjustments | | | | | |

**Change Summary Explanation**

Schedule:
Due to the complexity of the Pedestal components, the schedule has been updated to reflect the continuation of the Blk IV program into FY 2020 (Proj 3372).

Financial:
The FY 2020 funding request was reduced by $17.150 million to align the Shipboard Air Traffic Radar SATR (SPN 50) to the Service Cost Position in support of MS-C (Proj 0993).

The FY 2018 funding was reduced by a $1.783 million Congressional adjustment for AN/SPN-35 Block I Upgrade Delayed New Start (Proj 3372).

The FY 2018 funding was reduced by $4.000 million for a below threshold reprogramming for higher priority needs.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0718 / *MATCALS* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0718: *MATCALS* | 8.749 | 5.100 | 5.488 | 6.648 | - | 6.648 | 3.111 | 2.642 | 2.683 | 2.736 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Marine Air Traffic Control and Landing Systems (MATCALS) program provides for continued development, integration, and testing of hardware and software to meet requirements for all-weather operations and improved flight safety of Air Traffic Control (ATC) and Landing Systems at Marine Corps expeditionary airfields. An Acquisition Decision Memorandum from Jan 2005 approved the use of the U.S. Army AN/TPN-31 Air Traffic Navigation, Integration, and Coordination System (ATNAVICS) to fulfill the Air Surveillance and Precision Approach Radar and Control System (ASPARCS) requirement for Jul 2006. The ATNAVICS will replace the legacy ATC Precision Approach Radar (PAR), Airport Surveillance Radar (ASR), and Command and Control Subsystem with a High Mobility Multipurpose Wheeled Vehicle based PAR, ASR and Command and Control Subsystem. The MROC Decision Memorandum 11-2005 of Dec 2004 outlines the evolutionary improvements required by Headquarters Marine Corps. This program works with the Marine ATC Working Group identifying the requirements to implement the P3I and evolutionary product improvements as required for G/ATOR, ATNAVICS, Expeditionary ATC Towers, and Navigational Aids that support Marine Air Traffic Control Detachments.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** ASPARCS Improvements | 0.640 | 1.089 | 0.587 | 0.000 | 0.587 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Investigate and resolve obsolescence issues. Perform studies and analyses to implement P3I and other evolutionary improvements. Develop criteria for existing ASPARCS software to achieve Defense Information Infrastructure-Common Operating Environment Level 5 compliance, Information Assurance, Radar Range Extension and Mapping functionality, and enhanced simulation and training into the existing ASPARCS software. Perform Mode 5/S integration, operational functionality study and analyses with AN/TPN-31(V)7 ATNAVICS System. | | | | | |
| ***FY 2019 Plans:***<br>Commence a Part I ECP to develop and test a prototype which upgrades/replaces the current precision approach capability. This ECP will reduce system hardware footprint, improve reliability and meet the requirement for multiple touchdown points. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue ATNAVICS ECP's that will reduce system hardware footprint, improve reliability and meet the requirement for multiple touchdown points. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0718 / *MATCALS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease of $0.502M between FY 2019 and FY 2020 is due to the funding required for the G/ATOR and VWC development efforts this same year. | | | | | |
| ***Title:*** Ground/Air Task Oriented Radar System (G/ATOR) | 2.560 | 2.870 | 3.533 | 0.000 | 3.533 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** G/ATOR is multi-role, ground-based, expeditionary radar that replaces five legacy radar systems for the Marine Air Ground Task Force. It satisfies the Marine Air Command and Control System and the Ground Counter Fire/ Counter Battery capabilities.<br>The G/ATOR replaces the AN/TPS-63 and complements the AN/TPS-59 long range radar and will provide mobile, multi-functional, three-dimensional surveillance of air breathing targets, detection of cruise missiles and Unmanned Aerial Systems, and the cueing of air defense weapons.<br>The G/ATOR contributes to the extension of Sea Shield/Sea Strike by surveillance and detection of enemy air threats not seen by Navy sensors in the littorals by participating in a cooperative engagement network of sensors and shooters; G/ATOR enables Integrated Fire Control (IFC) and provides engage/fire on remote capability.<br>G/ATOR surveillance coverage with IFC will provide unprecedented reach, volume and precision in the execution of Operational Maneuver From The Sea allowing Naval forces to project and sustain power deep inland.<br>G/ATOR will add Mode 5/S capability, Federal Aviation Administration flight certification requirements, and the ability to integrate with AN/TPN-31(V) ATNAVICS for Precision Approach Radar.<br>This increment of G/ATOR replaces the Marine Corps' AN/TPS-73 radar and the Airport Surveillance Radar portion of the ATNAVICS also known as Air Surveillance and Precision Approach Radar Control System.<br><br>***FY 2019 Plans:***<br>Continue developing the TEMP that supports the Mode 5/S integration into G/ATOR, includes the JOTA event required by the Marine Corps and a plan for obtaining DoD AIMS certification for the G/ATOR platform.<br>Continue system testing of the G/ATOR Mode 5/S integration for FAA and DoD AIMS certification and use by all G/ATOR blocks.<br><br>***FY 2020 Base Plans:***<br>Continue developing the TEMP that supports the Mode 5/S integration into G/ATOR, includes the JOTA event required by the Marine Corps and a plan for obtaining DoD AIMS certification for the G/ATOR platform. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0718 / *MATCALS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue system testing of the G/ATOR Mode 5/S integration for FAA and DoD AIMS certification and use by all G/ATOR blocks.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase of $0.663M from FY 2019 to FY 2020 is due to the additional testing required leading up to system certification. | | | | | |
| ***Title:*** Virtual Warfare Center Support<br>***Articles:***<br>***Description:*** Virtual Warfare Center (VWC) Support - This project supports fully interactive operator in the loop simulations in support of the Virtual Warfare Center (VWC) in order to quantify USMC Integrated Air and Missile Defense (IAMD) family of systems performance and how it impacts effectiveness in the IAMD mission area.<br>***FY 2019 Plans:***<br>Support integration and continued development of Designs of Experiment related to marine Air Ground Task Force IAMD capabilities. Provide event technical support for additional analysis events. Conduct and document analysis results for USMC stakeholders.<br>***FY 2020 Base Plans:***<br>Continue to support integration and development of Designs of Experiment related to marine Air Ground Task Force IAMD capabilities. Provide event technical support for additional analysis events. Conduct and document analysis results for USMC stakeholders.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase of $0.999M from FY 2019 to FY 2020 is due to FY19 being reduced for the "virtual warfare center support delayed new start" reduction. Fifty percent of the FY18 funding will be expended in FY19 due to the "six month delayed<br>start" in FY18, therefore the actual increase between what will be executed in FY19 and FY20 is minimal. | 1.900<br>- | 1.529<br>- | 2.528<br>- | 0.000<br>- | 2.528<br>- |
| **Accomplishments/Planned Programs Subtotals** | 5.100 | 5.488 | 6.648 | 0.000 | 6.648 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0718 / *MATCALS* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0204460M: *G/ATOR* | 53.605 | 44.579 | 23.891 | - | 23.891 | 10.524 | 12.176 | 12.302 | 12.547 | Continuing | Continuing |
| • OPN/2820: *Ashore ATC Equipment/MATCALS* | 10.547 | 5.421 | 5.570 | - | 5.570 | 5.687 | 5.990 | 6.123 | 6.245 | Continuing | Continuing |

**Remarks**

Ashore ATC Equipment: FY2018-FY2024 reflects MATCALS portion of Ashore ATC Equipment budget.

**D. Acquisition Strategy**

An Acquisition Decision Memorandum was signed in Jan 2005 approving the procurement of the Army AN/TPN-31 ATNAVICS to fulfill the Air Surveillance and Precision Approach Radar and Control System requirement for July 2006. The MROC Decision Memorandum 11-2005 of December 2004 outlined the evolutionary improvements required by Headquarters Marine Corps. This program has joined with the Army to implement Pre-Planned Product Improvements and evolutionary product improvements.

G/ATOR will add Mode 5/S capability, FAA flight certification requirements, and the ability to integrate with AN/TPN-31 ATNAVICS for Precision Approach Radar.

The Marine Air Traffic Control (ATC) Working Group identified requirements to address obsolescence issues with ATC Expeditionary Towers. These requirements were validated by APX-25 and a Decision Analysis Study was conducted by NAVAIR 4.10. Funding will address development of expeditionary ATC Tower capability improvements via the Engineering Change Proposal process.

**E. Performance Metrics**

The MATCALS RDTEN funding will be used to continue development of evolutionary improvements envisioned by Headquarters Marine Corps for the MATCALS Family of Systems.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0718 / *MATCALS* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HDW Develop - ASPARCS Mode 5/S | WR | NAWCAD : Patuxent River, MD | 1.383 | 0.215 | Feb 2018 | 0.500 | Dec 2018 | 0.410 | Dec 2019 | - | | 0.410 | 0.000 | 2.508 | - |
| Primary HDW Develop - ASPARCS | WR | SPAWARSYSCEN : San Diego, CA | 0.510 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.510 | - |
| Primary HDW Develop - ASPARCS | C/CPFF | TRANDES : San Diego, CA | 1.783 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.783 | 1.783 |
| | | **Subtotal** | 3.676 | 0.215 | | 0.500 | | 0.410 | | - | | 0.410 | 0.000 | 4.801 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development - G/ ATOR | WR | NSWC : Dahlgren, VA | 0.619 | 0.000 | Feb 2018 | 1.000 | Feb 2019 | 0.956 | Mar 2020 | - | | 0.956 | Continuing | Continuing | Continuing |
| Software Development - ASPARCS | WR | NAWCAD : Patuxent River, MD | 3.663 | 0.320 | Mar 2018 | 0.589 | Mar 2019 | 0.716 | Mar 2020 | - | | 0.716 | Continuing | Continuing | Continuing |
| Software Development - Mode 5/S Dev - G/ATOR | SS/CPIF | Telephonics : Huntington Station, NY | 0.024 | 2.560 | Mar 2018 | 1.670 | Oct 2018 | 1.700 | Nov 2019 | - | | 1.700 | Continuing | Continuing | Continuing |
| Engineering Support - VWC | TBD | NSMA : TBD | 0.000 | 1.320 | Jan 2018 | 0.950 | Oct 2018 | 1.506 | Jan 2020 | - | | 1.506 | Continuing | Continuing | Continuing |
| Software Development - VWC | C/BA | TBD : TBD | 0.000 | 0.580 | Jan 2018 | 0.419 | Jan 2019 | 1.000 | Jan 2020 | - | | 1.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 4.306 | 4.780 | | 4.628 | | 5.878 | | - | | 5.878 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 0.567 | 0.055 | Jan 2018 | 0.160 | Jan 2019 | 0.160 | Jan 2020 | - | | 0.160 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0718 / *MATCALS* | |

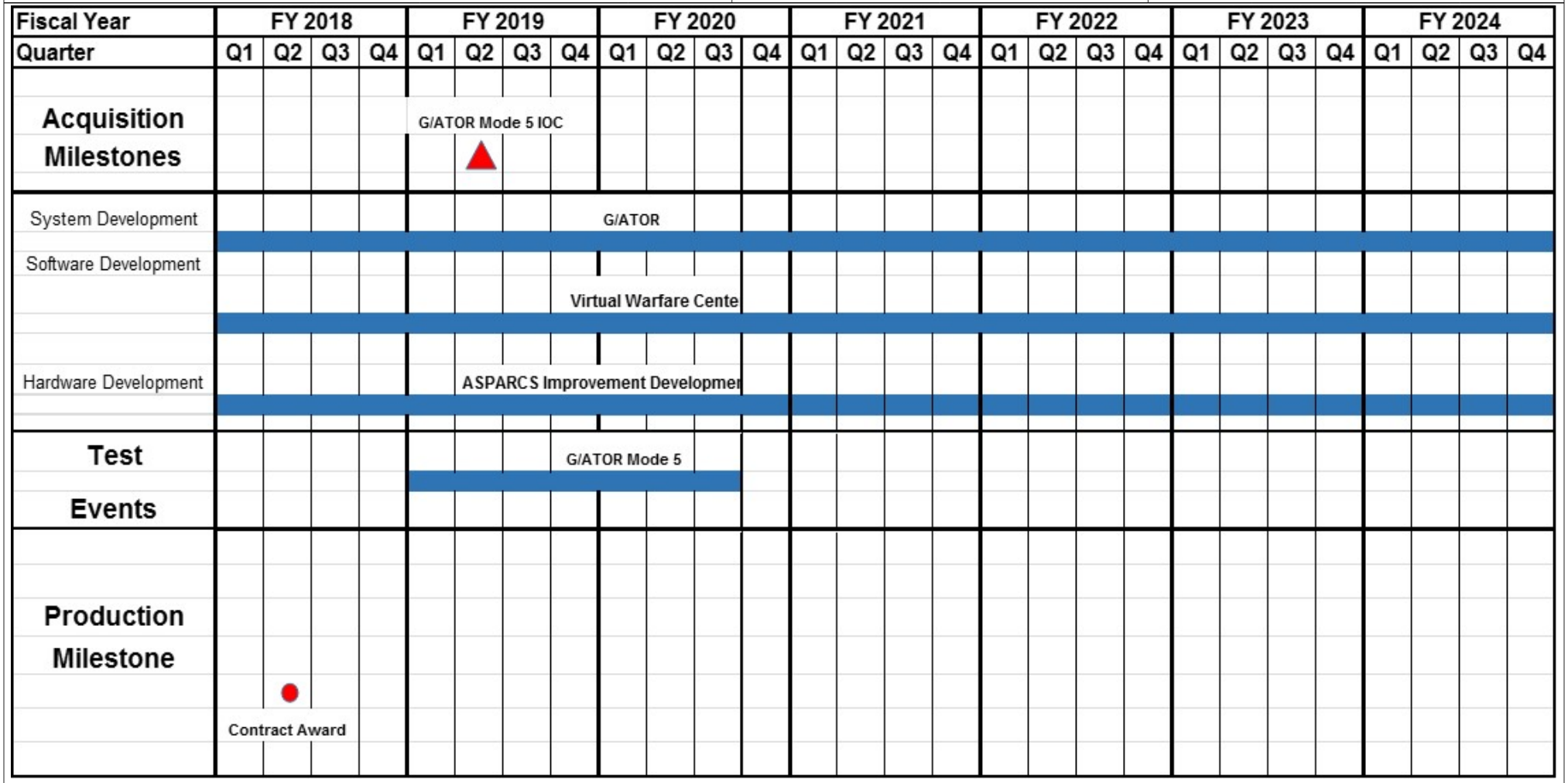
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | G/ATOR : PEO Land Systems | 0.200 | 0.050 | Jan 2018 | 0.200 | Jan 2019 | 0.200 | Jan 2020 | - | | 0.200 | 0.000 | 0.650 | - |
| | | **Subtotal** | 0.767 | 0.105 | | 0.360 | | 0.360 | | - | | 0.360 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 8.749 | 5.100 | | 5.488 | | 6.648 | | - | | 6.648 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0718 / *MATCALS* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0718 / *MATCALS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***MATCALS*** | | | | |
| Acquisition Milestones: G/ATOR Mode 5 IOC | 2 | 2019 | 2 | 2019 |
| System Development: Software Development: G/ATOR | 1 | 2018 | 4 | 2024 |
| System Development: Software Development: Visual Warfare Center | 1 | 2018 | 4 | 2024 |
| System Development: Hardware Development: ASPARCS improvements | 1 | 2018 | 4 | 2024 |
| System Development: Test Events: G/ATOR Mode 5 | 1 | 2019 | 3 | 2020 |
| System Development: Production Milestones: G/ATOR Mode 5 integration | 2 | 2018 | 2 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0993 / *Carrier ATC* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0993: *Carrier ATC* | 137.564 | 34.301 | 33.679 | 15.522 | - | 15.522 | 11.735 | 10.033 | 7.992 | 8.151 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Shipboard Air Traffic Control systems, interfacing with versions of the AN/TPX-42A(V) Direct Altitude and Identity Readout (DAIR), allow shipboard Air Traffic Controllers to identify, marshal, and direct aircraft within a 50 Nautical Mile (NM) radius of the ship. In recent years, the top 25 percent of the AN/SPN-43C frequency band has been reallocated to the Fixed Wireless Access Community prohibiting Air Traffic Control (ATC) Air Search Radar (ASR) operation within 50NM of the coast. Because the Navy requires an air traffic control surveillance radar, this project unit will include engineering efforts to identify requirements and develop the AN/SPN-50(V)1 as an AN/SPN-43C replacement system. In addition, bridging Engineering Change Proposals (ECP) will be required to sustain the AN/SPN-43C capability until the AN/SPN-50(V)1 is completely fielded. Finally, the AN/TPX-42A(V) DAIR continues to undergo several phased upgrades that have resulted in a number of field changes/technology refresh/insertion efforts. System improvements include replacing militarized front-end equipment in the track processor with open architecture Commercial Off the Shelf technology, converting the operational program software to more commonly used and flexible "C" language, providing the "hooks" for potential interface with Mode 5 Identification Friend or Foe, and integrating a flat panel monitor into the controller work station. The development of an ATC common console will reduce operational costs, improve reliability, and provide compatible interfaces and commonality for all ATC workstations. The addition of an embedded trainer within AN/TPX-42A(V) will improve controller training and increase flight safety. This effort includes addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AN/SPN-50 | 24.262 | 26.428 | 9.561 | 0.000 | 9.561 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project funds the development of the AN/SPN-43C replacement program (AN/SPN-50), which was previously funded under AN/SPN-43C and is being broken out for administrative reasons. This system enables Air Traffic Controllers to assure the safe and expeditious movement of air traffic. This capability is an enabler in maintaining launch/recovery cycle times/sortie rates. | | | | | |
| ***FY 2019 Plans:***<br>Execute contract mod(s) for SPN-50 to add incremental funding. Delivery of EDM #3 and modification of EDM #1 and #2 to post-CDR Configuration. Complete the second and final phase of OEM training for fleet and test operators. Conduct development and operational land-based testing (IT-B1) and environmental analysis/testing (IT-B2). Maintenance Demonstrations (M-demos), Built in Test demonstrations (BIT-demos), and Logistics Demonstrations (LOG-demos) will be conducted during the IT-B1 test periods. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0993 / *Carrier ATC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY18-19 increase is due to increase in material cost for Solid State Transmitter (SSTx), Unplanned emerging Risk Management Framework and Component Level Environmental Stress Screening (ESS) testing.<br><br>The AN/SPN-50 development schedule was updated to reflect the result of a 9 month, December 2015 to September 2016, delay to the award of the AN/SPN-50 development contract. SSR/PDR, CDR, Post PDR Review, Pre-CDR configurations, EDM deliveries, and O&M Training, were moved by two quarters. Updated O&M was moved three quarters. AN/SPN - 43 Test and Evaluation schedule for "System Deliveries" was added because of AN/SPN-43 ECP delivered to ships that require testing and evaluation to support the Fleet until SPN-50 is delivered.<br>***FY 2020 Base Plans:***<br>Land-based testing will continue. Manufacturing maturity will be evaluated and a Production Readiness Review will be conducted. Documentation will continue to be updated leading up to the execution of a Milestone C in FY 2020.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 of $16.867M is due to the AN/SPN-50 development program ramping down in preparation for Milestone C and a production contract in FY 2020. | | | | | |
| ***Title:*** AN/SPN-43C | 2.187 | 2.256 | 2.301 | 0.000 | 2.301 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funds development of sustainment Engineering Change Proposals (ECP) for the AN/SPN-43C. The sustainment effort will ensure the capabilities provided by the AN/SPN-43C remain available to CVN, LHA and LHD type ships until the replacement system is fielded.<br>***FY 2019 Plans:***<br>Continued sustainment ECPs for AN/SPN-43C.<br>***FY 2020 Base Plans:***<br>Continued sustainment ECPs for AN/SPN-43C.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0993 / *Carrier ATC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase from FY 2019 to FY 2020 is due to inflation. | | | | | |
| ***Title:*** AN/TPX-42 | 7.852 | 4.995 | 3.660 | 0.000 | 3.660 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project funds the ongoing modernization of the AN/TPX-42 system through engineering changes and technology refresh, to include CyberSecurity requirements and compliance. Specific engineering changes are: Development of an Air Traffic Control (ATC) Multi-Function Console (MFC) which will reduce operational costs, improve reliability, and provide common hardware for all ATC workstations. Additionally, MFC will provide interfaces for emerging/planned sensors.<br><br>***FY 2019 Plans:***<br>Continue Multifunction Console (MFC) ECP inclusive of interface development for AN/SPN-50(V)1 and EASR. Begin sustainment ECPs for AN/TPX-42.<br><br>***FY 2020 Base Plans:***<br>Continue Multifunction Console (MFC)/AN/SYY-1 ECP inclusive of interface development for AN/SPN-50(V) and EASR. Begin Sustainment of ECPS for AN/TPX-42. Note: AN/SYY-1 will be the Tech Solution for Multifunction Console ECP.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 of $1.335M is due to the ramping down of the MFC ECP. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 34.301 | 33.679 | 15.522 | 0.000 | 15.522 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2830: *Afloat ATC Equipment: SATC* | 8.657 | 8.593 | 26.849 | - | 26.849 | 40.128 | 44.093 | 63.005 | 64.268 | Continuing | Continuing |

**Remarks**

Afloat ATC Equipment: FY2018-2024 reflects Ship Air Traffic Control (SATC) portion of the Afloat ATC Equipment budget.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0993 / *Carrier ATC* |

**D. Acquisition Strategy**

AN/TPX-42 Voice/Video recorder replacement, Joint Precision Approach and Landing System Interface, Shipboard trainer, and Air Traffic Control (ATC) Console are all anticipated ECPs, with improvements being incorporated into the production of AN/TPX-42 upgrade kits.

AN/SPN-50 replacement program is an ACAT IVT program. All other projects are non-ACAT upgrades to existing systems. An evolutionary acquisition approach is being used to introduce these technology advancements that either satisfy user requirements, such as all weather operation, or address supportability and cost of ownership problems.

**E. Performance Metrics**

AN/SPN-50(V)1 incremental funding procured long lead items to support post-CDR EDM 2QFY18. Attain Milestone C 3QFY20.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0993 / *Carrier ATC* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HDW Develop-TPX-42 | WR | NAWCAD : PAX River, MD | 4.993 | 0.973 | Dec 2017 | 0.563 | Dec 2018 | 0.574 | Dec 2019 | - | | 0.574 | Continuing | Continuing | Continuing |
| Primary HDW Develop - SPN-43 | WR | NAWCAD : PAX River, MD | 4.189 | 0.484 | Dec 2017 | 0.475 | Dec 2018 | 0.484 | Dec 2019 | - | | 0.484 | Continuing | Continuing | Continuing |
| Primary HDW Develop - SPN-50(V)1 Pre-CDR Configuration EDM | C/CPIF | SAAB : Syracuse NY | 17.951 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.951 | 17.951 |
| Primary HDW Develop - SPN-50(V)1 Post-CDR Configuration EDM | C/CPIF | SAAB : Syracuse NY | 12.782 | 8.620 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 8.620 | 30.022 | 30.022 |
| Primary HDW EMD - SPN-50(V)1 | C/CPIF | SAAB : Syracuse NY | 0.000 | 6.503 | Dec 2017 | 18.060 | Jan 2019 | 4.109 | Dec 2019 | - | | 4.109 | 2.000 | 30.672 | 30.672 |
| Prior year Prod Dev no longer funded in the FYDP | Various | Various : TBD | 17.902 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.902 | - |
| | | **Subtotal** | 57.817 | 16.580 | | 19.098 | | 5.167 | | - | | 5.167 | Continuing | Continuing | N/A |

**Remarks**

SPN-50 HDW Development contract award will include the modifications to meet SPN-50 requirements, to include hardware redesign, development, and integration & test of above and below deck hardware to increase redundancy to expand operational availability from 94% to 98%.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development-TPX-42 | WR | NAWCAD : PAX River, MD | 19.455 | 3.050 | Dec 2017 | 2.300 | Dec 2018 | 2.307 | Dec 2019 | - | | 2.307 | Continuing | Continuing | Continuing |
| Integrated Logistics Support- TPX-42 | WR | NAWCAD : PAX River, MD | 1.859 | 0.220 | Dec 2017 | 0.120 | Dec 2018 | 0.122 | Dec 2019 | - | | 0.122 | Continuing | Continuing | Continuing |
| Integrated Logistics Support-SPN-43 | WR | NAWCAD : PAX River, MD | 1.131 | 0.224 | Dec 2017 | 0.245 | Dec 2018 | 0.249 | Dec 2019 | - | | 0.249 | Continuing | Continuing | Continuing |
| Integrated Logistics Support-SPN-50(V)1 | WR | NAWCAD : PAX River, MD | 2.015 | 0.806 | Dec 2017 | 0.850 | Dec 2018 | 0.445 | Dec 2019 | - | | 0.445 | Continuing | Continuing | Continuing |
| Studies & Analysis-SPN-50(V)1 | WR | NAWCAD : PAX River, MD | 5.005 | 0.800 | Dec 2017 | 0.800 | Dec 2018 | 0.200 | Dec 2019 | - | | 0.200 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0993 / *Carrier ATC* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development - SPN-50(V)1 | WR | NAWCAD : PAX River, MD | 10.809 | 3.702 | Dec 2017 | 2.182 | Dec 2018 | 0.245 | Dec 2019 | - | | 0.245 | Continuing | Continuing | Continuing |
| Studies & Analysis- SPN-43 | WR | NAWCAD : PAX River, MD | 2.029 | 0.020 | Dec 2017 | 0.020 | Dec 2018 | 0.021 | Dec 2019 | - | | 0.021 | Continuing | Continuing | Continuing |
| Studies & Analysis- TPX-42 | WR | NAWCAD : PAX River, MD | 0.921 | 0.500 | Dec 2017 | 0.100 | Dec 2018 | 0.102 | Dec 2019 | - | | 0.102 | Continuing | Continuing | Continuing |
| Systems Engineering- SPN-50(V)1 | WR | NAWCAD : PAX River, MD | 8.175 | 3.000 | Dec 2017 | 2.822 | Dec 2018 | 2.726 | Dec 2019 | - | | 2.726 | Continuing | Continuing | Continuing |
| Prior Year Support no longer funded in the FYDP | Various | Various : Various | 13.393 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.393 | - |
| Studies & Analysis SPN-50(V)1 | WR | Variou : VA | 0.402 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.402 | - |
| | | **Subtotal** | 65.194 | 12.322 | | 9.439 | | 6.417 | | - | | 6.417 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation- TPX-42 | WR | NAWCAD : PAX River, MD | 3.145 | 0.900 | Dec 2017 | 0.712 | Dec 2018 | 0.726 | Dec 2019 | - | | 0.726 | Continuing | Continuing | Continuing |
| Development Test & Evaluation - SPN-43 | WR | NAWCAD : PAX River, MD | 2.073 | 1.459 | Dec 2017 | 1.516 | Dec 2018 | 1.520 | Dec 2019 | - | | 1.520 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation-SPN-50(V)1 | WR | OPTEVOR : Norfolk, VA | 1.305 | 1.840 | Dec 2017 | 1.893 | Dec 2018 | 0.611 | Dec 2019 | - | | 0.611 | Continuing | Continuing | Continuing |
| Prior year T&E no longer funded in the FYDP | Various | Various : Various | 1.707 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.707 | - |
| Development Test & Evaluation SPN-50 | WR | NAWCAD : PAX River | 1.000 | 0.000 | | 0.000 | | 0.061 | Dec 2019 | - | | 0.061 | 0.000 | 1.061 | - |
| | | **Subtotal** | 9.230 | 4.199 | | 4.121 | | 2.918 | | - | | 2.918 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>0993 / *Carrier ATC* |

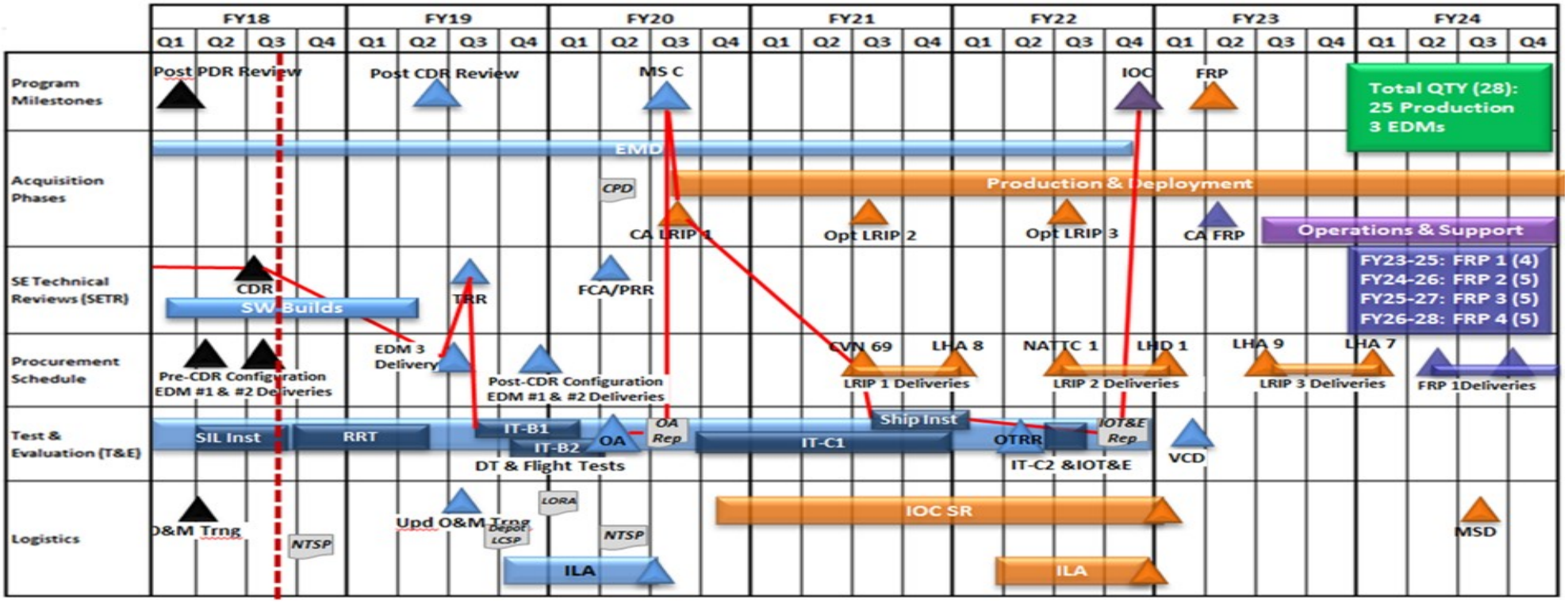
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | American Electronics, Inc. : California, MD | 3.095 | 0.500 | Dec 2017 | 0.309 | Dec 2018 | 0.315 | Dec 2019 | - | | 0.315 | Continuing | Continuing | Continuing |
| Program Management Support | WR | NAWCAD : PAX River, MD | 1.878 | 0.500 | Dec 2017 | 0.509 | Dec 2018 | 0.500 | Dec 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| Travel | WR | NAVAIRHQ : PAX River, MD | 0.350 | 0.200 | Dec 2017 | 0.203 | Dec 2018 | 0.205 | Dec 2019 | - | | 0.205 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 5.323 | 1.200 | | 1.021 | | 1.020 | | - | | 1.020 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 137.564 | 34.301 | | 33.679 | | 15.522 | | - | | 15.522 | Continuing | Continuing | N/A |

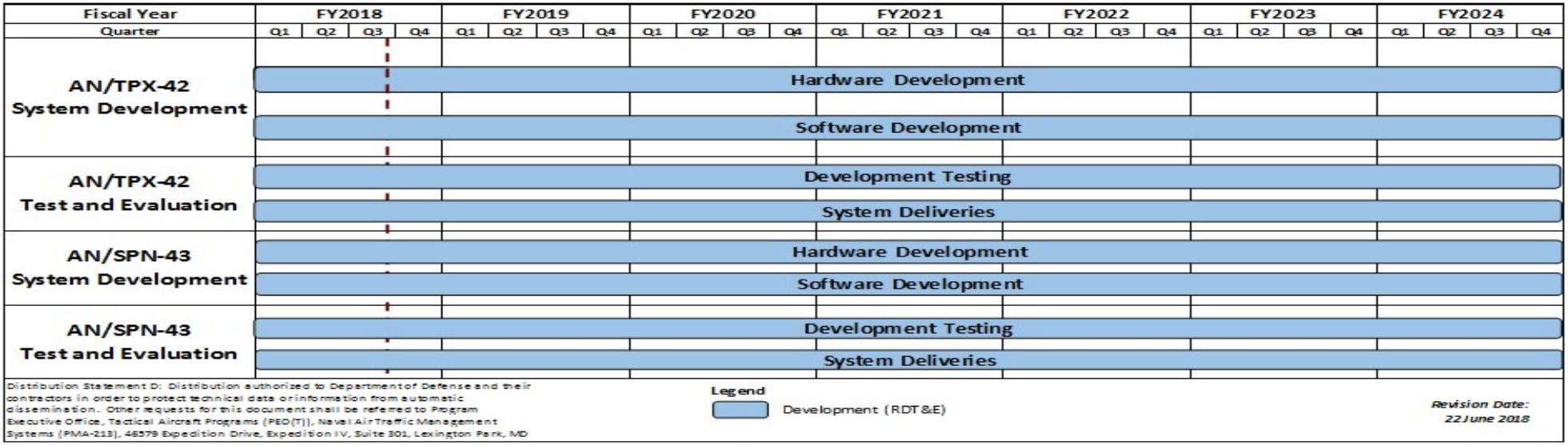
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0993 / *Carrier ATC* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0993 / *Carrier ATC* |

## AN/TPX-42 / AN/SPN-43 Schedule

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>0993 / *Carrier ATC* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Carrier ATC*** | | | | |
| Acquisition Milestones: Milestones: AN/SPN-50(V)1 Post CDR Review | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: Milestones: AN/SPN-50(V)1 Milestone C | 3 | 2020 | 3 | 2020 |
| System Development: Hardware Development: AN/SPN-43C | 1 | 2018 | 4 | 2024 |
| System Development: Hardware Development: AN/TPX-42A(V) | 1 | 2018 | 4 | 2024 |
| System Development: Software Development: AN/SPN-43C | 1 | 2018 | 4 | 2024 |
| System Development: Software Development: AN/TPX-42A(V) | 1 | 2018 | 4 | 2024 |
| System Development: Reviews: Critical Design Review (CDR) (AN/SPN-50(V)1) | 3 | 2018 | 3 | 2018 |
| Test and Evaluation: Developmental Testing/Operational Testing (AN/SPN-50(V)1) | 3 | 2019 | 2 | 2020 |
| Test and Evaluation: Developmental Testing (AN/TPX-42A(V)) | 1 | 2018 | 4 | 2024 |
| Test and Evaluation: Developmental Testing (AN/SPN-43C) | 1 | 2018 | 4 | 2024 |
| Deliveries: Pre-CDR Configuration Prototype Delivery (AN/SPN-50(V)1) | 2 | 2018 | 2 | 2018 |
| Deliveries: Post-CDR Configuration Prototype Delivery (AN/SPN-50(V)1) | 3 | 2019 | 3 | 2019 |
| Deliveries: System Deliveries (TPX-42A(V)) | 1 | 2018 | 4 | 2024 |
| Deliveries: System Deliveries (AN/SPN-43C) | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>1657 / *ATC Improvement* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1657: *ATC Improvement* | 3.828 | 0.411 | 0.419 | 0.416 | - | 0.416 | 0.424 | 0.435 | 0.443 | 0.451 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program provides for engineering development, integration, adaptation, and testing of new and/or modernized Air Traffic Control (ATC) systems, air navigational aids, landing systems, and ATC communication systems for Naval and Marine Corps Air Stations (NAS/MCAS) and Fleet ATC Systems. These systems are critical to Naval Aviation and provide for safe, efficient air operations. Additionally, the Federal Aviation Administration (FAA) is affecting major modernization of the National Airspace System (NAS). The Navy must maintain compatibility with FAA-developed ATC systems in order to ensure seamless interoperability within the NAS. NAS modernization initiatives in Project 1657 include the Visual Information Display System (VIDS) and follow-on Pre-Planned Product Improvements, with additional RDT&E efforts required for modified commercial-off-the-shelf ATC systems and equipment for modernization and recapitalization of these systems at our NAS, MCAS & Fleet Area Control & Surveillance Facilities (FACSFACs) worldwide.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** NAS MOD VIDS | 0.209 | 0.210 | 0.207 | 0.000 | 0.207 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continue engineering development of pre-planned product improvements for the VIDS and initiate efforts to incorporate VIDS into the FACSFACs. Research display alternatives for Navy ATC systems, and evaluate alternatives for future communication and radar systems. | | | | | |
| ***FY 2019 Plans:***<br>Continue engineering development of Pre-Planned Product Improvement for VIDS to incorporate multiple weather source inputs. Continue STARS and VIDS engineering development for technology insertion. Continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue engineering development of Pre-Planned Product Improvement for VIDS to incorporate multiple weather source inputs. Continue STARS and VIDS engineering development for technology insertion. Continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>1657 / *ATC Improvement* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The decrease of $0.003M from FY 2019 to FY 2020 is due to Working Capital Fund inflation rates. | | | | | |
| ***Title:*** Fleet ATC Systems | 0.202 | 0.209 | 0.209 | 0.000 | 0.209 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Research efforts to determine the best technical approach to integrate various data link and communication system upgrades into Navy/Marine Corps ATC Systems including, but not limited to, the Digital Airport Surveillance Radar (DASR) and the DoD Advanced Automation Systems (DAAS) into the Fleet Area Control and Surveillance Facilities. Evaluate alternative for future processor/display, sensor and communication systems.<br><br>***FY 2019 Plans:***<br>Continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system. Continue evaluation of future processor/display, sensor and communication systems.<br><br>***FY 2020 Base Plans:***<br>Continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system. Continue evaluation of future processor/display, sensor and communication systems.<br><br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.411 | 0.419 | 0.416 | 0.000 | 0.416 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2820: *Ashore ATC Equipment: NASMOD/Fleet ATC* | 35.900 | 35.696 | 36.385 | - | 36.385 | 37.545 | 39.299 | 40.322 | 41.127 | Continuing | Continuing |

**Remarks**

Ashore ATC Equipment: FY2018-FY2024 reflects NASMOD and Fleet ATC portions of Ashore ATC budget.

**D. Acquisition Strategy**

All projects are non-ACAT upgrades to existing systems. An evolutionary acquisition approach is being used to introduce technology advancements that either satisfy emergent requirements or address supportability and cost of ownership problems.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>1657 / *ATC Improvement* |

**E. Performance Metrics**

The Air Traffic Control (ATC) Improvement continues to research, evaluate and develop displays and other alternatives for Navy ATC, communication and radar systems. Maintain compatibility with the FAAs next generation Air Traffic Control System.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>1657 / *ATC Improvement* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HDW Develop - VIDS | WR | SPAWAR Systems Command : Charleston, SC | 1.956 | 0.209 | Dec 2017 | 0.210 | Dec 2018 | 0.207 | Dec 2019 | - | | 0.207 | Continuing | Continuing | Continuing |
| Primary HDW Develop - Fleet ATC | WR | SPAWAR Systems Center : Charleston, SC | 0.936 | 0.202 | Dec 2017 | 0.209 | Dec 2018 | 0.209 | Dec 2019 | - | | 0.209 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.892 | 0.411 | | 0.419 | | 0.416 | | - | | 0.416 | Continuing | Continuing | N/A |

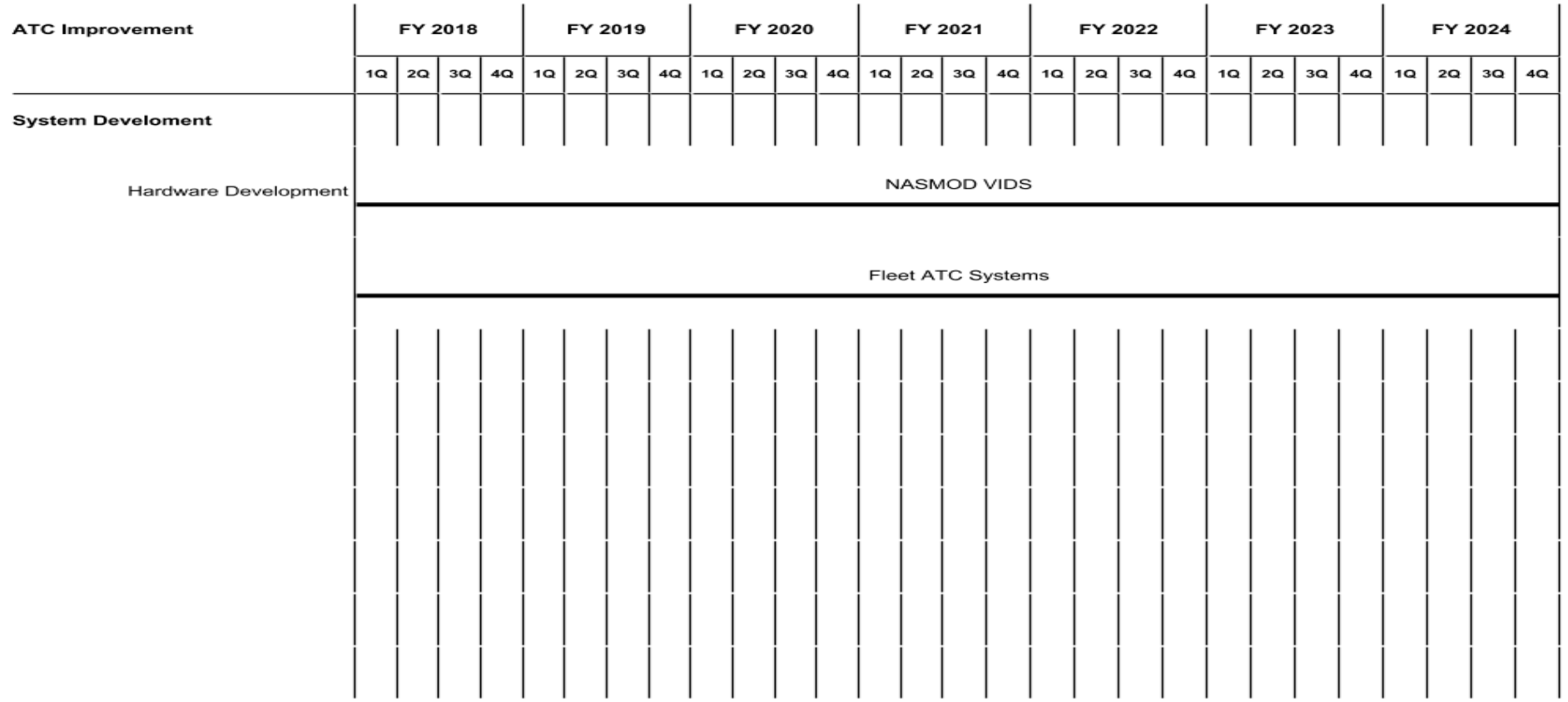
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | SPAWAR Systems Center : Charleston, SC | 0.936 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.936 | - |
| | | **Subtotal** | 0.936 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.936 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 3.828 | 0.411 | | 0.419 | | 0.416 | | - | | 0.416 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>1657 / *ATC Improvement* |




*2020PB - 0604504N - 1657*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>1657 / *ATC Improvement* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ATC Improvement*** | | | | |
| System Develoment: Hardware Development: NASMOD VIDS | 1 | 2018 | 4 | 2024 |
| System Develoment: Hardware Development: Fleet ATC Systems | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604504N / *Air Control* | Project (Number/Name)<br>3372 / *ATC Systems* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3372: *ATC Systems* | 39.017 | 28.200 | 21.912 | 22.337 | - | 22.337 | 21.574 | 16.974 | 18.191 | 18.552 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Landing System Upgrade Program (LSUP) is essential to maintain the United States Navy's capability to perform safe and expeditious aircraft landings aboard CVN and LHA/D vessels. The Navy's Precision Approach and Landing Capability requirements have necessitated Life Cycle Extension upgrades to legacy landing systems, AN/SPN-35, AN/SPN-41 and AN/SPN-46. The LSUP program will modernize technology that was developed and fielded over 30 years ago. It is estimated that without these upgrades, the Navy will lose its Automatic Carrier Landing System capability within 5 years. Cyber Security requirements have driven increased efforts to remain compliant with software CyberSecurity directives and Information Assurance mandates. Maintaining compliance is critical to retaining authorization to operate within the Fleet.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AN/SPN-46 Blk IV Upgrade | 14.951 | 8.534 | 4.458 | 0.000 | 4.458 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The AN/SPN-46 Blk IV program targets aging and obsolete components within the carrier landing systems and replaces them with modernized and sustainable components. Blk IV consists of antenna pedestal upgrades, addresses transmitter obsolescence issues, and replacement of obsolete circuit cards, and Cybersecurity. | | | | | |
| ***FY 2019 Plans:***<br>Pedestal components of the Pedestal/Transmitter configuration will continue to be fabricated and integrated with the new transmitter and circuit cards. Support required for hardware/software integration. Perform EMI qualification testing for the pedestal components of the pedestal/transmitter configuration. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete qualification testing of the Pedestal configuration. Complete flight testing of the AN/SPN-46 Blk IV pedestal/transmitter configuration with the Baron commercial aircraft and F/A-18. Complete development of Block IV upgrade. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Decrease of $4.076M from FY 2019 to FY 2020 is due to the AN/SPN-46 Blk IV completion. | | | | | |
| ***Title:*** AN/SPN-35 Blk I Upgrade | 13.249 | 7.957 | 6.246 | 0.000 | 6.246 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This accomplishment provides for the development, upgrade, redesign, integration, and testing of the AN/SPN-35C Block I upgrade. AN/SPN-35C is the Precision Approach Radar aboard LHA/LHD class ships and is used for Mode III aircraft recovery which ensures the safe approach and landing of all LH-class embarked aircraft during adverse weather & night conditions. The AN/SPN-35C Block I upgrade will include engineering efforts to upgrade, redesign, replace, and support common failure items (Receiver, Radar Processing Controller (RPC), Main Input/output Processor (MIOP), Control-Indicators). Included in these efforts are changes to obsolete components and analog systems, ensuring the radar capability is available to the fleet and extending the service life of the AN/SPN-35C to 2040. | | | | | |
| ***FY 2019 Plans:***<br>Perform Test Readiness Review (TRR) and begin qualification and flight testing. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete flight testing. Complete development of the AN/SPN-35 Blk I upgrade. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $1.711M from FY 2019 to FY 2020 is due to the AN/SPN-35 Blk I upgrade completion. | | | | | |
| ***Title:*** AN/SPN-46 Blk V Upgrade (CCAs, RTOS, software, RAM pole, TS-3098) | 0.000 | 5.421 | 11.633 | 0.000 | 11.633 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The AN/SPN-46 Block V upgrade targets aging and obsolete hardware and software components within the carrier landing system and replaces them with modernized and supportable components. Blk V consists of a major AN/<br>SPN-46 operational software upgrade along with a refresh of numerous Commercial Off The Shelf (COTS) equipment<br>subassemblies. Planned upgrades are updates to the radar's obsolete radar processor circuit card assemblies (CCAs) with<br>new generation CCAs, upgrading the radar's Real Time Operating System (RTOS) with a current and supportable RTOS, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and optimizing and reconfiguring the radar's software into a logical, modular format. The radar's top two degraders, the<br>Radar Alignment Mast (RAM) pole and the TS-3098 test set, will be modified with less complex, higher reliability designs.Hardware changes will include reducing reliability issues caused by outdated bus systems and IP based substructures and provide as overall system hardening to mitigate external interference issues. The software architecture redesign and optimization will increase modularity and operational efficiency as well as implement M-Code and resolve cyber security related issues inherent with the current system.<br><br>***FY 2019 Plans:***<br>Complete Analysis of Alternatives (AoA) for the individual engineering changes, start engineering designs to support<br>Preliminary Design Review (PDR) level reviews for the radar CCAs, RTOS, software, RAM pole and the TS-3098 which<br>together comprise the Blk V upgrade. Incorporate Risk Management Framework (RMF) Step III controls requirements into<br>the LSUP Block V efforts.<br><br>***FY 2020 Base Plans:***<br>Complete engineering design reviews and documentation updates for all updated components through Critical Design<br>Review (CDR).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $6.212M from FY 2019 to FY 2020 is due to the ramping up of the AN/SPN-46 Blk V Upgrade program.<br>Cost Increases capture the effort required to update the AN/SPN-46 Real Time Operating System (RTOS) and associated<br>processors. This includes standing up a new software (SW) RTOS development environment (Tornado to Workbench) as<br>the current development environment is obsolete and unsupportable. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 28.200 | 21.912 | 22.337 | 0.000 | 22.337 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2830: *Afloat ATC Equipment/ACLS* | 28.621 | 39.297 | 40.561 | - | 40.561 | 43.017 | 43.035 | 43.929 | 45.807 | Continuing | Continuing |

**Remarks**

Afloat ATC Equipment: FY 2018-FY 2024 reflects ACLS portion of Afloat ATC Equipment budget.

**D. Acquisition Strategy**

Landing System Upgrade Program consists of lifecycle extension upgrades to the AN/SPN-35C Precision Approach Radar, AN/SPN-41B Instrument Control Landing Systems and AN/SPN-46 Automatic Carrier Landing Systems which support Air Traffic Control (ATC) operations on board CVN, LHA, and/or LHD-class ships. This effort includes numerous commercial off-the-shelf (COTS) component refresh updates which are urgently needed to sustain the operational viability of these Naval ATC systems supporting fleet air operations for at least the next 15 years until the next generation ATC system is fully implemented. This COTS refresh will include analysis and upgrade of key system components that are critical to overall system operation but have become increasingly difficult to maintain over the past few years. Recent adjustments in the direction and scope of Naval ATC systems have necessitated a re-evaluation of the long-term viability and sustainability of the current Fleet ATC equipment.

The Resources and Requirements Review Board approved the DON Precision Approach and Landing Capability (PALC) Roadmap per Decision Memorandum (DM) Ser: N8B/13U141053 dtd 03 July 2013. This PALC Roadmap re-scoped Joint Precision Approach and Landing System (JPALS) into a single increment and deferred JPALS capability from legacy fleet aircraft. As a result, a requirement to sustain current SPNs through 2030 has emerged. Per Enclosure 1 of the above DM, the Landing Systems Upgrade Program will be comprised of upgrades to the AN/SPN-46, AN/SPN-35C, and AN/SPN-41B. It is anticipated that each SPN upgrade will go through separate Systems Engineering Technical Review (SETR) processes.

**E. Performance Metrics**

Test Readiness Review (TRR) scheduled for 4th quarter FY 2019 of the AN/SPN-46 Block IV and AN/SPN-35 Block I upgrade. Critical Design Review (CDR) scheduled for 3rd quarter FY 2020, and TRR scheduled for 4th quarter FY 2021 for AN/SPN-46 Block V upgrade.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - AN/SPN-46 Blk IV Upgrade | WR | NAWCAD : Patuxent River, MD | 14.525 | 6.780 | Nov 2017 | 1.123 | Nov 2018 | 1.258 | Nov 2019 | - | | 1.258 | Continuing | Continuing | Continuing |
| Ancillary Hardware Development - AN/SPN-46 Blk IV Upgrade | C/CPFF | Sierra Nevada Corp (SNC) : Reno, NV | 17.586 | 5.337 | Dec 2017 | 2.934 | Nov 2018 | 1.175 | Nov 2019 | - | | 1.175 | 0.000 | 27.032 | 27.032 |
| Primary Hardware Development - AN/SPN-35 Blk I Upgrade | WR | NAWCAD : Patuxent River, MD | 2.026 | 5.236 | Nov 2017 | 3.455 | Nov 2018 | 1.761 | Nov 2019 | - | | 1.761 | Continuing | Continuing | Continuing |
| Ancilliary Hardware Development - AN/SPN-35 Blk I Upgrade | WR | NAWCAD : Patuxent River, MD | 0.272 | 4.083 | Nov 2017 | 2.532 | Nov 2018 | 2.857 | Nov 2019 | - | | 2.857 | Continuing | Continuing | Continuing |
| Primary Hardware Development - AN/SPN - 46 Blk V Upgrade | C/CPFF | Sierra Nevada Corp (SNC) : Reno, NV | 0.000 | 0.000 | | 3.005 | Nov 2018 | 4.710 | Nov 2019 | - | | 4.710 | 5.453 | 13.168 | 13.168 |
| Ancilliary Hardware Development - AN/SPN-46 Blk V Upgrade | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 1.249 | Nov 2018 | 4.578 | Nov 2019 | - | | 4.578 | 0.000 | 5.827 | - |
| | | **Subtotal** | 34.409 | 21.436 | | 14.298 | | 16.339 | | - | | 16.339 | Continuing | Continuing | N/A |

**Remarks**

Increase from FY 2019 to FY 2020 for AN/SPN-46 Block V is due to engineering efforts required for CDR in 3rd quarter FY 2020.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support (ILS) | WR | NAWCAD : Patuxent River, MD | 0.937 | 1.275 | Nov 2017 | 1.300 | Nov 2018 | 1.229 | Nov 2019 | - | | 1.229 | Continuing | Continuing | Continuing |
| Systems Engineering Support | WR | NAWCAD : Patuxent River, MD | 1.554 | 2.050 | Nov 2017 | 1.995 | Nov 2018 | 1.880 | Nov 2019 | - | | 1.880 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.491 | 3.325 | | 3.295 | | 3.109 | | - | | 3.109 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/SPN-46 Blk IV Upgrade | WR | NAWCAD : Patuxent River, MD | 0.492 | 2.312 | Nov 2017 | 2.402 | Nov 2018 | 0.892 | Nov 2019 | - | | 0.892 | Continuing | Continuing | Continuing |
| AN/SPN-35 Blk I Upgrade | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.217 | Nov 2018 | 0.498 | Nov 2019 | - | | 0.498 | Continuing | Continuing | Continuing |
| AN/SPN-46 Blk V Upgrade | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.123 | Nov 2018 | 0.252 | Nov 2019 | - | | 0.252 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.492 | 2.312 | | 2.742 | | 1.642 | | - | | 1.642 | Continuing | Continuing | N/A |

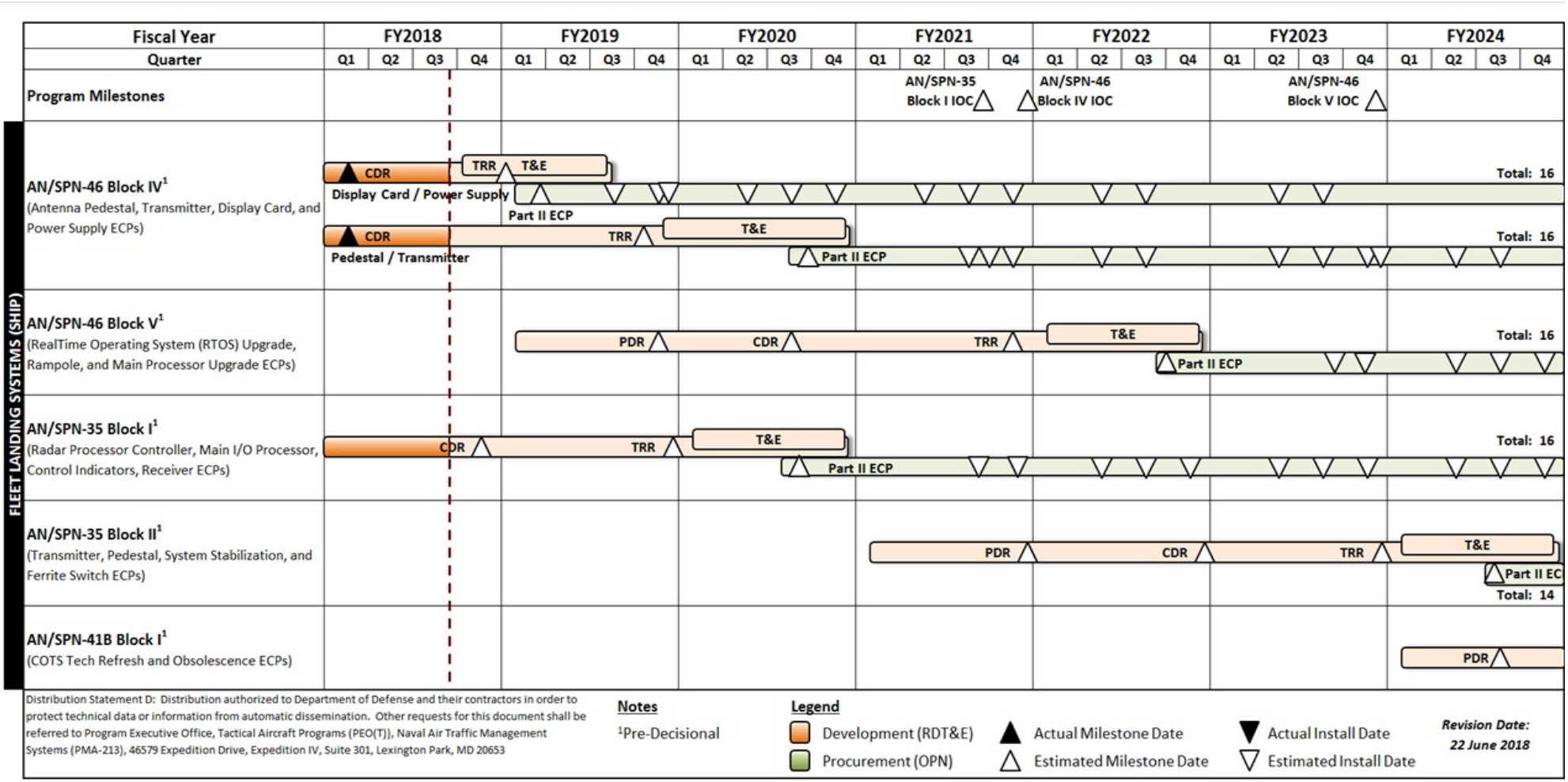
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management (PM) Support | WR | NAWCAD : Patuxent River, MD | 1.312 | 0.777 | Nov 2017 | 1.190 | Nov 2018 | 1.004 | Nov 2019 | - | | 1.004 | Continuing | Continuing | Continuing |
| PM Suppt - MSS | C/CPAF | TBD : Patuxent River, MD | 0.313 | 0.350 | Nov 2017 | 0.387 | Nov 2018 | 0.243 | Nov 2019 | - | | 0.243 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.625 | 1.127 | | 1.577 | | 1.247 | | - | | 1.247 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 39.017 | 28.200 | | 21.912 | | 22.337 | | - | | 22.337 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604504N / *Air Control* | **Project (Number/Name)**<br>3372 / *ATC Systems* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3372*** | | | | |
| Reviews: AN/SPN-35 Blk I Critical Design Review (CDR) | 4 | 2018 | 4 | 2018 |
| Reviews: AN/SPN-46 Blk V Preliminary Design Review (PDR) | 4 | 2019 | 4 | 2019 |
| Reviews: AN/SPN-46 Blk V Critical Design Review (CDR) | 3 | 2020 | 3 | 2020 |
| Test and Evaluation: AN/SPN-46 Blk IV Test Readiness Review (TRR) Display Card/ Power Supply | 1 | 2019 | 1 | 2019 |
| Test and Evaluation: AN/SPN-46 Blk IV (TRR) Pedestal/Transmitter | 4 | 2019 | 4 | 2019 |
| Test and Evaluation: AN/SPN-35 Blk I (TRR) | 4 | 2019 | 4 | 2019 |
| Test and Evaluation: AN/SPN-46 Blk V (TRR) | 4 | 2021 | 4 | 2021 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604512N *I Shipboard Aviation Systems* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 899.123 | 174.034 | 13.710 | 10.632 | - | 10.632 | 11.026 | 11.799 | 12.142 | 12.381 | Continuing | Continuing |
| 2232: *CV/CVN Launch and Recover* | 899.123 | 174.034 | 9.710 | 10.632 | - | 10.632 | 11.026 | 11.799 | 12.142 | 12.381 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 4.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.000 |

**Note**

Advanced Arresting Gear (AAG) will be funded under AAG PE 0604530N, PU 2367 in FY 2019 and later.

**A. Mission Description and Budget Item Justification**

CV Launch & Recover System - This Navy unique project addresses the System Development and Demonstration (SDD) of systems required to recover and launch Navy/Marine Corps Aircraft (Fixed/Rotary Wing and Vertical/Short Take Off and Landing) operating aboard aircraft carriers, amphibious assault ships, and air capable ships. This program element includes the following:

(1) Advanced Arresting Gear (AAG)
(2) Aircraft Launch & Recovery Equipment Modernization
(3) Aircraft Launch and Recovery Equipment Service Life Management program

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 177.926 | 9.710 | 10.636 | - | 10.636 |
| Current President's Budget | 174.034 | 13.710 | 10.632 | - | 10.632 |
| Total Adjustments | -3.892 | 4.000 | -0.004 | - | -0.004 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 4.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -3.892 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.008 | - | -0.008 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.004 | - | 0.004 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604512N *I Shipboard Aviation Systems* |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Improving Aircraft Carrier Readiness* | 0.000 | 4.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 4.000 |
| Congressional Add Totals for all Projects | 0.000 | 4.000 |

**Change Summary Explanation**

Cost/Summary: AAG funding included under 0604512N in FY 2018 and prior.

Schedule: N/A

Technical: AAG established in its own PE and PU in FY 2019 and out.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604512N / *Shipboard Aviation Systems* | Project (Number/Name)<br>2232 / *CV/CVN Launch and Recover* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2232: *CV/CVN Launch and Recover* | 899.123 | 174.034 | 9.710 | 10.632 | - | 10.632 | 11.026 | 11.799 | 12.142 | 12.381 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

PY article includes Advanced Arresting Gear (AAG) Jet Car Track Site and two Improved Manually Operated Visual Landing Aid System (IMOVLAS) production representative models. Service Life Management Program (SLMP) test articles refer to actual units (two units per ship set).

**A. Mission Description and Budget Item Justification**

This Navy unique project addresses the System Development and Demonstration (SDD) of systems required to recover and launch Navy/Marine Corps Aircraft (Fixed/ Rotary Wing and Vertical/Short Take-Off and Landing) operating aboard aircraft carriers (CVN), amphibious assault ships and air capable ships. This program includes the following systems under Project 2232, including the funding of production representative models for:

(1) Advanced Arresting Gear (AAG): The AAG program will design, develop, test and field an aircraft arrestment system to replace the legacy Mark 7 arresting gear. AAG systems will be installed on all new construction aircraft carriers. AAG will provide the U.S. Navy with improved operational capability, while reducing operating and support costs. The AAG system will recover all existing and projected carrier based tail hook-equipped air vehicles well into the 21st century. The AAG Program's SDD phase test article consists of a single wire configured aircraft arresting system, which includes associated hardware and software needed to conduct system integrated testing by arresting both dead-loads and aircraft. Starting FY 2019 and later, AAG is funded under program element 0604530N.

(2) Aircraft Launch & Recovery Equipment (ALRE) Modernization: ALRE Modernization encompasses efforts required to ensure continued functional performance, operational relevance, and cybersecurity accreditation for all product lines across the ALRE program. This includes efforts required to resolve emerging obsolescence issues (both hardware and software), implement fleet driven operational capability upgrades, and comply with cybersecurity requirements and computer task order requirements for security threat mitigation. Effort includes:

(a) Improved Manually Operated Visual Landing Aid System (IMOVLAS): IMOVLAS will be the manual backup for Improved Fresnel Lens Optical Landing System (IFLOLS), which is the primary carrier Visual Landing Aid. IMOVLAS will be used in high sea states or if IFLOLS is inoperable. IMOVLAS will mirror current IFLOLS configuration in size & display.

(3) Aircraft Launch & Recovery Equipment (ALRE) Service Life Management Program (SLMP): The ALRE SLMP for Launcher and Recovery is required to sustain carrier aviation operations of higher energy aircraft launch and recoveries that are increasing loads on the ALRE systems, and that are affecting availability, maintainability and cost. This program will consist of service life assessment and extension initiatives and will establish the design foundation (structural, reliability, and maintainability analyses), permit appropriate assessment, track and focus design changes where most needed. Two SLMP prototypes were procured in FY 2018.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Arresting Gear (AAG)<br>***Articles:***<br>***Description:*** The Advanced Arresting Gear (AAG) program is designing, developing, testing and fielding an aircraft arrestment system to replace the legacy Mark 7 arresting gear. Effort moved to PE 0604530N/ PU 2367 in FY 2019 and later.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 166.634<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Aircraft Launch & Recovery Equipment Modernization<br>***Articles:***<br>***Description:*** Improved Manually Operated Visual Landing Aid System (IMOVLAS) to improve carrier aviation operations.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 0.575<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Aircraft Launch & Recovery Equipment (ALRE) Service Life Management Program (SLMP)<br>***Articles:***<br>***Description:*** ALRE SLMP analyzes launch and recovery equipment to determine feasible fielded equipment improvements.<br>***FY 2019 Plans:*** | 6.825<br>2 | 9.710<br>- | 10.632<br>- | 0.000<br>- | 10.632<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Conduct land-based testing of Crosshead and Fixed Sheave prototypes. Continue analysis, design, development and testing of Recovery Assist, Securing and Traversing (RAST) components and subcomponents. Includes efforts to remove and install prototypes from the test site as well as execute fleet representative traps to compare engineering models for Crosshead and Fixed Sheaves and Main Engine Cylinders. Conduct developmental testing of Advanced Purchase Cables.<br>***FY 2020 Base Plans:***<br>Continue land-based testing of Crosshead and Fixed Sheave prototypes. Continue the testing for the Recovery Assist, Securing and Traversing (RAST) service life assessment. Begin the Aircraft Ship Integrated Secure and Transfer (ASIST) service life assessment. Start analysis and development of testing for Jet Blast Deflector (JBD) service life assessment.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase from FY 2019 to FY 2020 is to support the service life assessment for the Aircraft Ship Integrated Secure and Transfer (ASIST) and the Jet Blast Deflector (JBD). | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 174.034 | 9.710 | 10.632 | 0.000 | 10.632 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4213: *Aircraft Launch & Recovery Equipment-Aircraft Launch & Recovery Equipment* | 103.340 | 105.943 | 145.601 | 13.420 | 159.021 | 119.366 | 120.849 | 143.300 | 134.933 | Continuing | Continuing |
| • OPN/4217: *Advanced Arresting Gear* | 10.900 | 11.054 | 4.725 | - | 4.725 | 3.118 | 2.442 | 2.491 | 2.540 | 262.172 | 299.442 |
| • SCN/2001: *Carrier Replacement Program* | 4,130.704 | 1,573.181 | 2,347.000 | - | 2,347.000 | 2,644.700 | 2,323.613 | 1,929.000 | 1,718.000 | 8,447.524 | 47,802.298 |

**Remarks**

OPN 4213 includes a portion of line item funding for Aircraft Launch & Recovery Equipment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |

**D. Acquisition Strategy**

Advanced Arresting Gear (AAG): The Navy competitively awarded two Cost Plus Fixed Fee Technical Development phase contracts to develop the AAG system. Upon completion of the Preliminary Design and Integrated Baseline reviews, the Navy awarded a single Cost Plus Award Fee option to General Atomics for the System Development and Demonstration (SDD) phase to develop and demonstrate a production representative AAG at the NAVAIR Lakehurst Jet Car Track Site and Runway Arrested Landing Site. Continuing development on the SDD contract awarded in 2004.

Aircraft Launch & Recovery Equipment Modernization:
Improved Manually Operated Visual Landing Aid System (IMOVLAS): The Navy will develop IMOVLAS using commercial equipment racks, processors and Light Emitting Diodes (LEDs).

Aircraft Launch & Recovery Equipment Service Life Management Program (SLMP): This program will consist of Service Life Assessment and Extension initiatives and will establish the design foundation (structural, reliability and maintainability analyses), permit appropriate assessment, track and focus design changes where most needed.

**E. Performance Metrics**

Advanced Arresting Gear (AAG) will complete System Development and Demonstration integrated testing at Jet Car Track Site and Runway Arrested Landing Site. AAG will demonstrate its key performance parameters and readiness for operational test.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604512N / *Shipboard Aviation Systems* | Project (Number/Name)<br>2232 / *CV/CVN Launch and Recover* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Dev-AAG | C/CPAF | Gen Atomics : San Diego, CA | 620.014 | 96.769 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 23.709 | 740.492 | 740.492 |
| Primary HW Dev-AAG | WR | NAWCAD : Lakehurst, NJ | 57.875 | 28.852 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Primary HW Dev - AAG | C/CPAF | ESL : Cranston, RI | 3.300 | 3.531 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 2.714 | 9.545 | 9.545 |
| System Eng-AAG | WR | NAWCAD : Lakehurst, NJ | 28.659 | 8.706 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Primary HW Dev-Modern IMOVLAS | WR | NAWCAD : Lakehurst, NJ | 3.138 | 0.211 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| System Eng-Modern IMOVLAS | WR | NAWCAD : Lakehurst, NJ | 0.654 | 0.069 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Primary HW Dev-SLMP | WR | NAWCAD : Lakehurst, NJ | 15.254 | 1.173 | Nov 2017 | 1.558 | Dec 2018 | 1.761 | Nov 2019 | - | | 1.761 | Continuing | Continuing | Continuing |
| Prior Year Cost No Longer Funded in FYDP | Various | Various : Various | 53.148 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 53.148 | - |
| | | **Subtotal** | 782.042 | 139.311 | | 1.558 | | 1.761 | | - | | 1.761 | Continuing | Continuing | N/A |

**Remarks**

Note: The contractor General Atomics, San Diego, CA has waived all remaining Award Fees.
The increase from FY 2019 to FY 2020 is to support the service life assessment for the Aircraft Ship Integrated Secure and Transfer (ASIST) and the Jet Blast Deflector (JBD).

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ILS-AAG | WR | NAWCAD : Lakehurst, NJ | 18.723 | 5.439 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Government Eng Support - AAG | WR | Various : Various | 0.381 | 0.409 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| ILS-Modern IMOVLAS | WR | NAWCAD : Lakehurst, NJ | 0.428 | 0.110 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Studies & Analysis-SLMP | WR | NAWCAD : Lakehurst, NJ | 14.048 | 3.684 | Nov 2017 | 2.605 | Dec 2018 | 2.829 | Nov 2019 | - | | 2.829 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604512N / *Shipboard Aviation Systems* | Project (Number/Name)<br>2232 / *CV/CVN Launch and Recover* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Cost No Longer Funded in FYDP | Various | Various : Various | 1.741 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.741 | - |
| | | **Subtotal** | 35.321 | 9.642 | | 2.605 | | 2.829 | | - | | 2.829 | Continuing | Continuing | N/A |

**Remarks**

The increase from FY 2019 to FY 2020 is to support the service life assessment for the Aircraft Ship Integrated Secure and Transfer (ASIST) and the Jet Blast Deflector (JBD).

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dev Test & Eval-AAG | WR | NAWCAD : Lakehurst, NJ | 59.870 | 22.167 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Operational T&E-AAG | WR | Various : Various | 2.589 | 0.306 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Integrated Testing-Modern IMOVLAS | WR | NAWCAD : Lakehurst, NJ | 0.309 | 0.185 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Materials/Validation Testing-SLMP | WR | NAWCAD : Lakehurst, NJ | 12.644 | 1.968 | Nov 2017 | 5.547 | Dec 2018 | 6.042 | Nov 2019 | - | | 6.042 | Continuing | Continuing | Continuing |
| Prior Year Cost No Longer Funded in FYDP | Various | Various : Various | 3.570 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.570 | - |
| | | **Subtotal** | 78.982 | 24.626 | | 5.547 | | 6.042 | | - | | 6.042 | Continuing | Continuing | N/A |

**Remarks**

The increase from FY 2019 to FY 2020 is to support the service life assessment for the Aircraft Ship Integrated Secure and Transfer (ASIST) and the Jet Blast Deflector (JBD).

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Mgmt Support | C/CPFF | Sierra : California, MD | 2.038 | 0.300 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 1.003 | 3.341 | 3.341 |
| Travel | Reqn | NAVAIR : Patuxent River, MD | 0.505 | 0.040 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604512N / *Shipboard Aviation Systems* | Project (Number/Name)<br>2232 / *CV/CVN Launch and Recover* | |

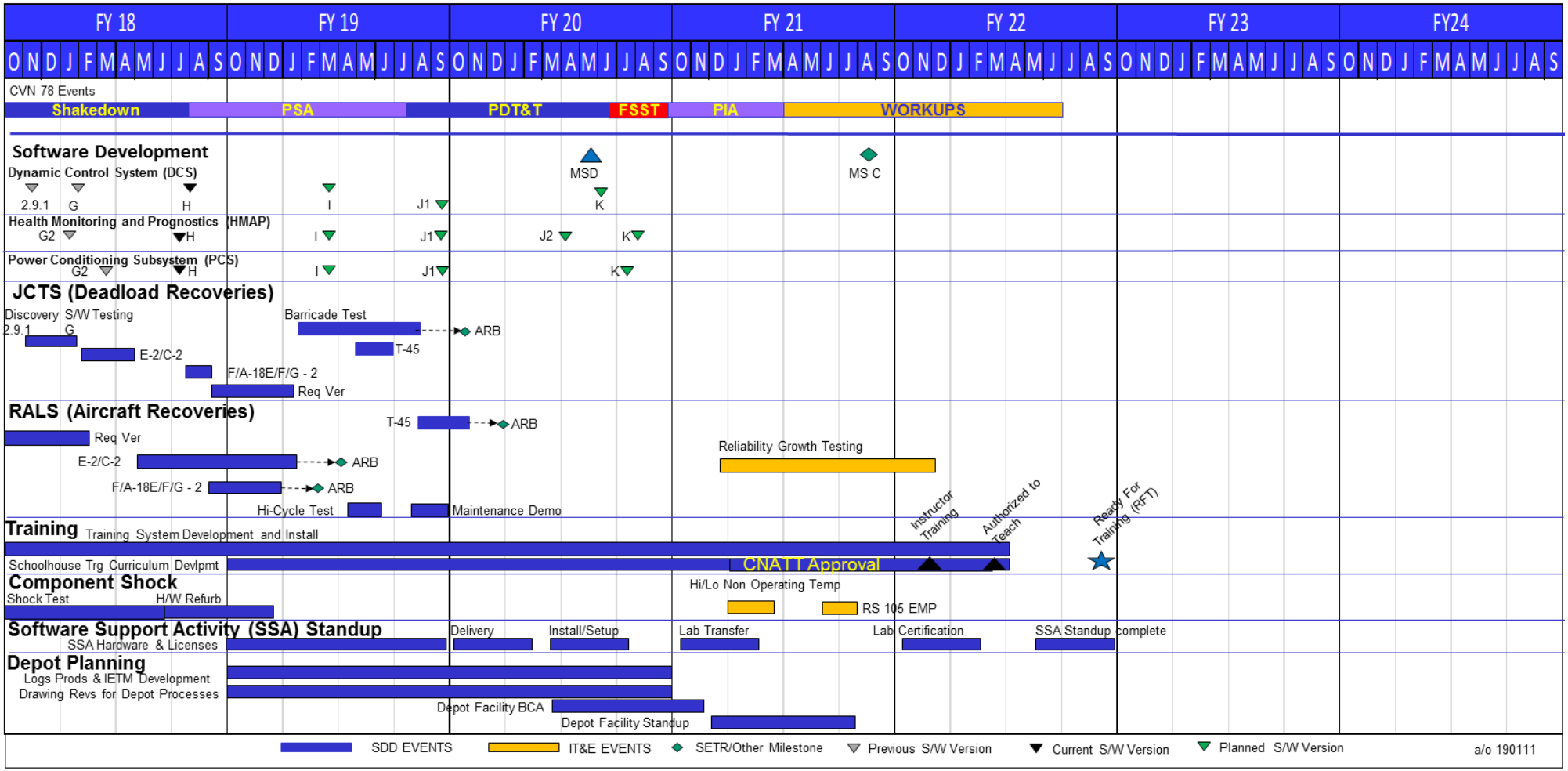
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Mgmt Support | Various | Various : Various | 0.100 | 0.115 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.215 | - |
| Prior Year Cost No Longer Funded in FYDP | Various | Various : Various | 0.135 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.135 | - |
| | | **Subtotal** | 2.778 | 0.455 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 899.123 | 174.034 | | 9.710 | | 10.632 | | - | | 10.632 | Continuing | Continuing | N/A |

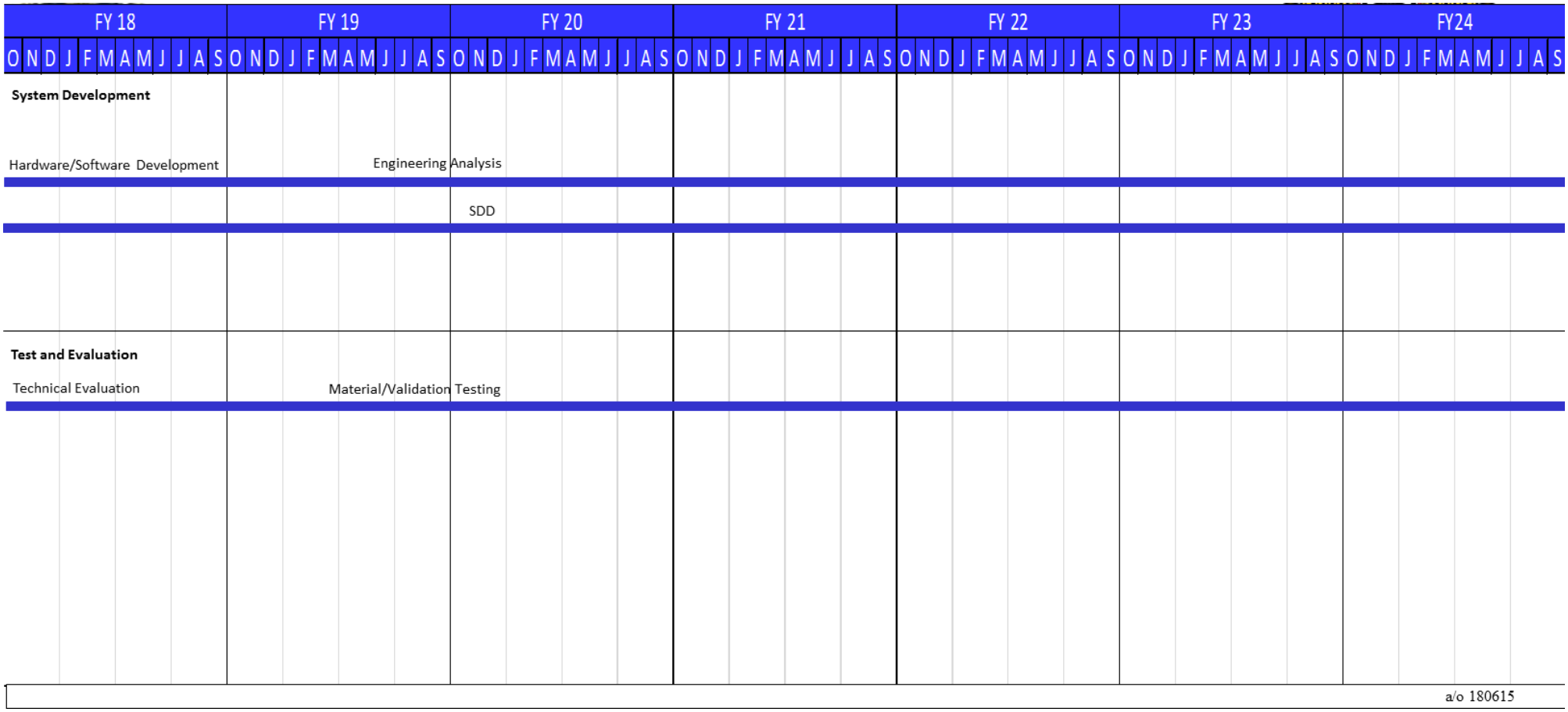
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |



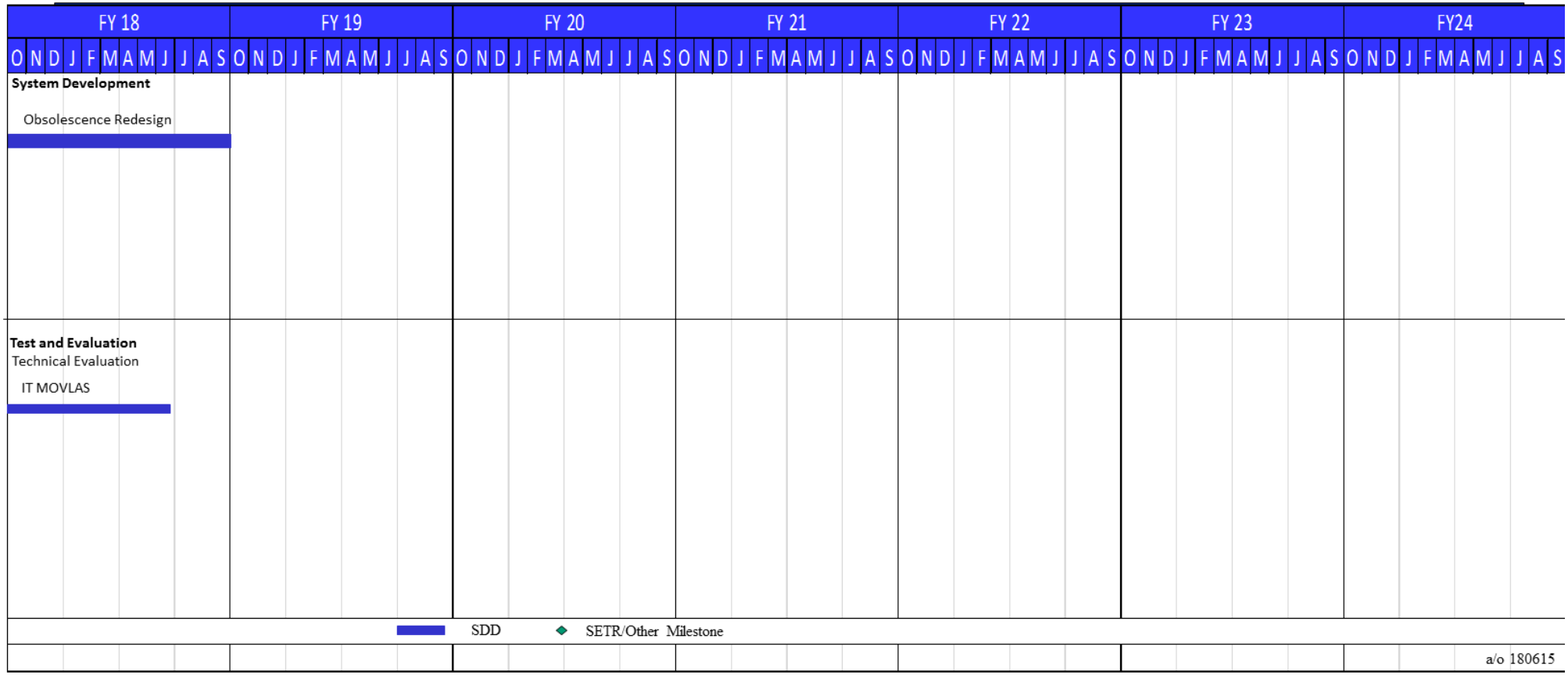
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |

# ALRE SLMP Schedule



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |

# ALRE Modernization Schedule



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>2232 / *CV/CVN Launch and Recover* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ADVANCED ARRESTING GEAR (AAG)*** | | | | |
| Aquisition Milestones: Milestones: Milestone C | 4 | 2021 | 4 | 2021 |
| Test & Evaluation: Technical Evaluation: Jet Car Test Site (JCTS) Test | 1 | 2018 | 1 | 2020 |
| Test & Evaluation: Technical Evaluation: Runway Arrested Landing Site Test (RALS) | 1 | 2018 | 1 | 2022 |
| ***ALRE SERVICE LIFE MANAGEMENT PROGRAM (SLMP)*** | | | | |
| Systems Development: Hardware/Software Development: System Development | 1 | 2018 | 4 | 2024 |
| Test & Evaluation: Technical Evaluation: Test & Evaluation | 1 | 2018 | 4 | 2024 |
| ***ALRE MODERNIZATION*** | | | | |
| Systems Development: Hardware/Software Development: Obsolescence Redesign Development and Testing | 1 | 2018 | 4 | 2018 |
| Test and Evaluation: Technical Evaluation: Integrated Test | 1 | 2018 | 3 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604512N / *Shipboard Aviation Systems* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 4.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 4.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Congressional Add. Program Increase to Improve Aircraft Carrier Readiness.

**A. Mission Description and Budget Item Justification**

Congressional Add. Program Increase to Improve Aircraft Carrier Readiness.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Improving Aircraft Carrier Readiness | 0.000 | 4.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** Funding will support Real-time Aircraft Launch and Recovery Equipment (ALRE) systems Check (REACH) system efforts to improve aircraft carrier readiness. | | |
| **Congressional Adds Subtotals** | 0.000 | 4.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604512N / *Shipboard Aviation Systems* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Development | TBD | TBD : TBD | 0.000 | 0.000 | | 3.500 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.500 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 3.500 | | 0.000 | | - | | 0.000 | 0.000 | 3.500 | N/A |

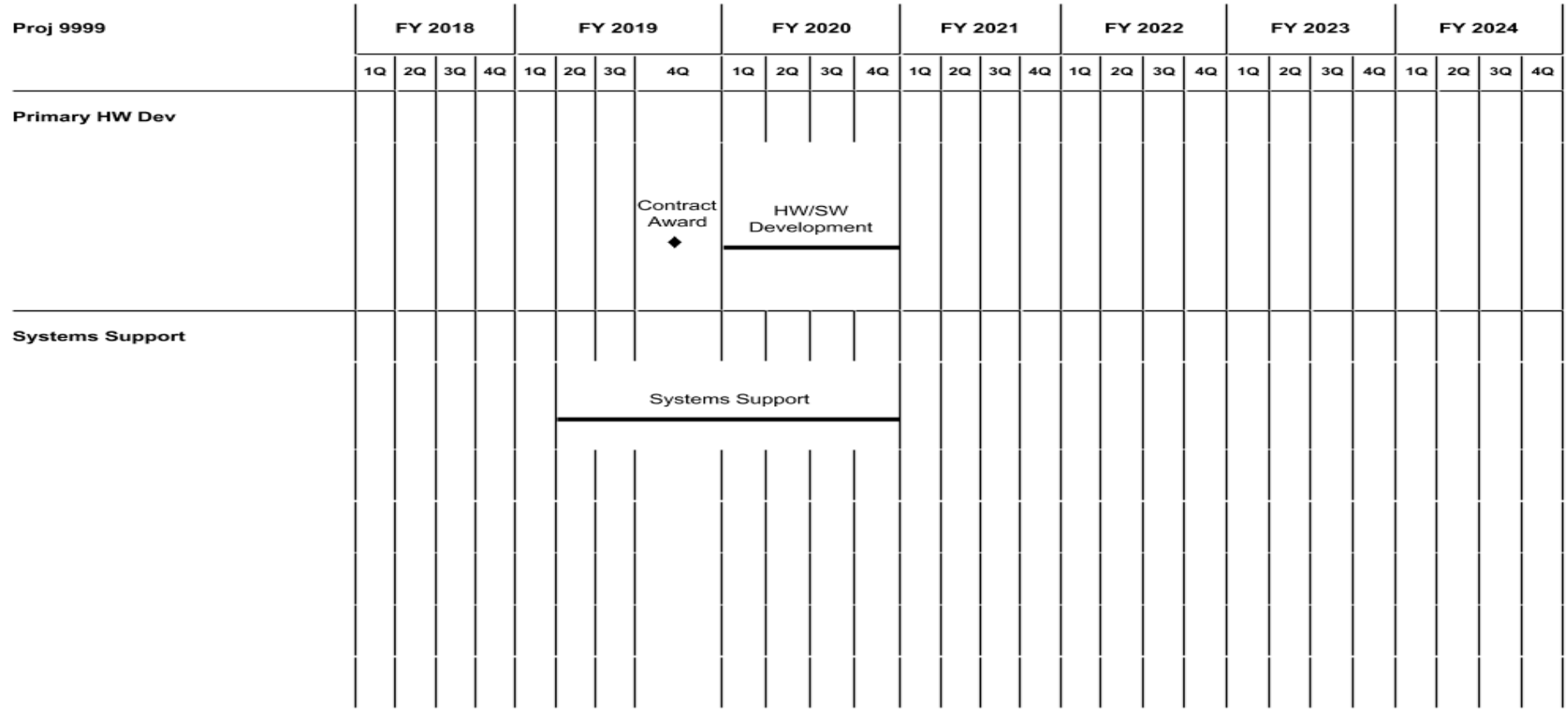
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Eng Spt | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 0.500 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.500 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 4.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604512N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604512N / *Shipboard Aviation Systems* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Primary HW Dev: Hardware/Software Development | 4 | 2019 | 4 | 2019 |
| Primary HW Dev: Hardware Software Development | 1 | 2020 | 4 | 2020 |
| Systems Support: Systems Support | 2 | 2019 | 4 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604518N *I Combat Information Center Conv* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 55.372 | 4.294 | 19.263 | 16.094 | - | 16.094 | 13.637 | 11.615 | 11.428 | 11.656 | Continuing | Continuing |
| 3094: *USW Decision Support* | 55.372 | 4.294 | 9.063 | 8.594 | - | 8.594 | 10.237 | 10.615 | 10.328 | 10.534 | Continuing | Continuing |
| 3439: *Project NAUTICA: Integrated Theater ASW C4I* | 0.000 | 0.000 | 10.200 | 7.500 | - | 7.500 | 3.400 | 1.000 | 1.100 | 1.122 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $1.0 million to account for the availability of prior year execution balances.

PROJECT 3094: Undersea Warfare Decision Support System (USW-DSS) is the Navy Program of Record (PoR) Anti-Submarine Warfare (ASW) Command & Control (C2) Net-Centric system supporting warfighters. USW-DSS is a C2 capability identified in the ASW Initial Capabilities Document (ICD), for the Sea Combat Commander (SCC) and Theater USW Commander (TUSWC). USW-DSS enables effective planning and execution of undersea warfare (USW) operations, optimizes placement of sensors for exploitation of the environment, manages available resources, balances operations versus risk, and provides a clear vulnerability assessment of the operational environment. Tactical data such as tracks, environmental, and sensor processing data is ingested into USW-DSS through platform specific interfaces such as the AN/SQQ-89A(V)15 sonar system, the Global Command and Control System - Maritime (GCCS-M), and Aircraft Carrier Tactical Support Center (CV-TSC). USW-DSS processes this and other tactical data and supports intelligent dissemination of the data to unit level and theater level platforms in support of an enhanced USW tactical picture. USW-DSS provides USW Commanders with an expanded, net-centric USW collaborative capability across Carrier Strike Group (CSG) platforms (CVNs, CGs, DDGs) as well as supporting shore nodes to include Commander Task Force (CTF), Naval Oceanographic Processing Facility (NOPF), and Tactical Operations Center (TOC), Mobile Tactical Operations Centers (M-TOC).

Future USW-DSS capability is phased to deliver timely and cost-effective software improvements to the warfighter via the Build / Fleet Capability Release (FCR) process. USW-DSS Build 3/FCR 1 continues the development of the integrated, near-real time, net-centric ASW Common Tactical Picture (CTP) / Common Operational Picture (COP) on an electronic Master Tactical Plot (eMTP) for the TUSWC and critical shore command sites. Through targeted architectural improvements, Build 3/ FCR 1 and follow-on FCRs will facilitate the migration of select components of USW-DSS to a DoD commercial cloud computing environment, thus improving software performance and scalability while keeping future hardware costs in check. Additionally, Build 3/FCR 1 and beyond are targeted to support operations across different security enclaves, and additional platform tactical data interfaces such as the P-8A Poseidon, submarines, and Integrated Undersea Surveillance System (IUSS) fixed sensors. On afloat platforms, USW-DSS processing software is virtualized for portability and is hosted on the Consolidated Afloat Networks and Enterprise Services (CANES) and implements a Service-Oriented Architecture (SOA). The current software version, Build 2 Release 3 (B2R3), will continue to field until the follow-on Build 3/FCR 2 (the next planned release to afloat assets) is ready for Initial Operational Capability (IOC) certification in FY 2022. For support nodes and ashore nodes USW-DSS processing software is hosted on Commercial Off The Shelf (COTS) hardware.

PROJECT 3439: Effective FY 2019, a new initiative titled Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA) was established for Theater Undersea Warfare (TUSW) architecture development, systems engineering, and design. NAUTICA integrates intelligence (operational and tactical) and sensor

(national and organic) systems to provide a fully informed Common Operational Picture (COP) of enemy undersea forces, maximizing decision superiority and theater level planning, and address TUSW Command and Control (C2).

The Navy plan for NAUTICA was approved by the June 2017 Flag Oversight Board and subsequently a roadmap was developed in FY 2018. The Theater Undersea Warfare Operations Center's (TUSWOC) systems today are not integrated to support performance requirements during all threat levels. This results in failure to most effectively employ Theater USW assets. Near term, FY 2019 accelerates development by rapid prototyping the framework for existing legacy systems to be federated to be exchange key information and significantly improve existing TUSW capability.

FY 2019 initiates the system engineering effort required to design, develop and deliver an integrated TUSW battle management suite in accordance with the 2007 Anti-Submarine Warfare (ASW) Initial Capabilities Document (ICD). The plan prioritizes NAUTICA investments in accordance with the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017). The design of the integrated TUSW battle management suite will include a system of systems TUSW architecture to enable the existing programs of record under development from PEO IWS, PEO C4I, PEO AIR, and N9SP to exploit a common framework. The common architecture will define the key data exchanges, common displays and processing, data models, cross domain interfaces, and multi-level security software that will enable systems such as Distributed Common on Ground System-Navy (DCGS-N) and USW-DSS to exchange, display and exploit information at the appropriate classifications.

Funding under this project will also establish a transition path for new technologies such as the Operational Planning Tool (OPT), Water Space Planner (WASP), Battle Management TDA, and other Future Naval Capabilities (FNCs) that will start to transition Technology Readiness Level (TRL) 5/6 enabling technologies into the USW-DSS and DCGS-N Programs of Record (PORs).

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 8.062 | 19.303 | 17.217 | - | 17.217 |
| Current President's Budget | 4.294 | 19.263 | 16.094 | - | 16.094 |
| Total Adjustments | -3.768 | -0.040 | -1.123 | - | -1.123 |
| • Congressional General Reductions | - | -0.040 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.103 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -1.059 | - | -1.059 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.064 | - | -0.064 |
| • Congressional Directed Reductions Adjustments | -3.665 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604518N *I Combat Information Center Conv* |

**Change Summary Explanation**

FUNDING CHANGES AT THE OVERALL PE LEVEL:

- FY 2018 decrease of -$3.768M included: -$3.665M for a Congressionally directed reduction and -$0.103M for Small Business Innovative Research (SBIR) transfer.
- FY 2019 decrease of -$0.040M reflects a Congressionally directed general reduction for Federally Funded Research and Development Centers (FFRDCs).
- FY 2020 decrease of -$1.123M included: -$1.000M reduction to account for the availability of prior year execution balances, -$0.059M for Contractor Services Reform reduction, and -$0.064M for various rate adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604518N / *Combat Information Center Conv* | Project (Number/Name)<br>3094 / *USW Decision Support* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3094: *USW Decision Support* | 55.372 | 4.294 | 9.063 | 8.594 | - | 8.594 | 10.237 | 10.615 | 10.328 | 10.534 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

USW-DSS B2R3 (development completed in FY 2013) provides integrated, near-real time, net-centric ASW CTP/COP for the carrier strike groups (CSGs). USW-DSS is a C2 capability, identified in the ASW ICD, for the Sea Combat, TUSW, and ASW Commanders, and enables warfighters to plan and conduct USW operations, align sensors for exploitation of the environment, allocate resources, optimize operations and risk, and perform vulnerability assessments. USW-DSS provides USW Commanders with an expanded net-centric USW capability across CSG platforms (CVNs, CG/DDGs, and SURTASS) as well as supporting shore nodes to include TOCs, M-TOCs, Training, NOPF, and CTF.

USW-DSS shortens C2 decision processes for detection-to-engagement across multiple platforms, including those with low-bandwidth communications or intermittent connectivity. For at-sea nodes, USW-DSS software processing requirements are hosted on CANES and implement a SOA while display generation and operator interfaces are provided via USW-DSS hardware. Ashore nodes host USW-DSS software on COTS hardware.

Starting in FY 2017, funding was restored to commence development of USW-DSS for TUSW (designated USW-DSS Build 3/FCR 1) and to re-architect B2R3 into a Modular Oriented System Architecture (MOSA), implement an electronic Master Tactical Plot (eMTP), modernize the tactical data interfaces and displays, and implement new mandated cyber security changes across all afloat platforms and shore nodes. Build 3 Fleet Capability Release (FCR) incremental developments will implement cost effective cyber security and TASW functionality by integrating inputs from data sources and platforms such as the P8-A Poseidon aircraft and associated Air ASW sensors, provide improved and additional functionality, and improve stability/reliability.

USW-DSS Build 3 will provide common and improved visualization, integrated USW platform sensor data sharing, reduced data entry, improved sensor performance predictions, data fusion, and reduced redundancy across USW Tactical Decision Aids (TDAs). The program will provide a greater understanding of the undersea battle space by allowing the entire force (carrier/expeditionary strike group, theater, or other) to have a common and thorough understanding of the battle space with characterized uncertainties.

The Navy continues to modernize and add sensor capabilities to existing PORs that are significant data sources of information for USW-DSS. These include, but are not limited to the AN/SQQ-89 Surface ASW Combat System, the AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC), Global Command and Control System - Maritime (GCCS-M), and the Distributed Common Ground System - Navy (DCGS-N). As the sensor capabilities and systems mature, the tactical data valuable to USW-DSS is incorporated as part of a future FCR.

USW-DSS Build 3 capability will a be a phased evolutionary acquisition approach to provide cost-effective capability improvements to the warfighter. The current software version, B2R3 (development completed in FY 2013), will continue to field on afloat platforms until the follow-on Build 3/FCR 2 is certified for Fleet deployment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3094 / *USW Decision Support* |

In FY 2020, USW-DSS will continue to develop and test the software changes and perform the certification testing necessary to address end of life (EOL) support issues impacting B2R3 as well as address emerging mandated cybersecurity requirements.

Additionally in FY 2020, funding will be used to develop, design, integrate, and test additional USW-DSS tools/capabilities for B3 including, but not limited to: Common Tactical Picture (CTP), Platform Data Fusion Integration, Cross-Platform Data Fusion, Automated Asset Allocation, Asset/Threat State Information, Vulnerability Analysis enhancement, ASW Track Management, Automated Re-planning, Engagement Target Pairing, improved TASW capabilities, Data-Focused Navy Tactical Cloud Integration, and incorporating the electronic Master Tactical Plot (eMTP) visualization/display service on which to render the CTP/COP. These improvements address requirements from the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** USW-DSS Capability Improvements | 4.294 | 9.063 | 8.594 | 0.000 | 8.594 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Design, develop, integrate, and test additional USW-DSS tools/capabilities for Build 3 including CTP, Platform Data Fusion integration, Cross-Platform Data Fusion, Theater Level Mission Planning, Automated Asset Allocation, Asset/Threat State Information, Vulnerability Analysis enhancement, ASW Track Management, Automated Re-planning, Engagement Target Pairing, improved TUSW capabilities, Data-Focused Navy Tactical Cloud Integration, and incorporation of the eMTP visualization/display service, and cyber security protection requirements. | | | | | |
| ***FY 2019 Plans:***<br>- Begin systems engineering bottoms-up product realization for USW-DSS Build 3/FCR 1.<br>- Conduct formal System Engineering Technical Reviews (SETR) to assess the technical and programmatic maturity of the development efforts to include Software Incremental Reviews (SWIR) and Test Readiness Reviews (TRR), working towards an Element Certification Review (ECR) in FY 2020, ahead of formal fielding of Build 3/FCR 1.<br>- Complete plans supporting early introduction of Build 3/FCR 1 capability through a series of capability drops.<br>- Develop the Cyber Security strategy for USW-DSS Build 3.<br>- Begin up-front systems engineering activities on Build/FCR 2, including development of a Build 3/FCR 2 Requirements Decision Package (RDP).<br>- Begin analysis and trade studies for the migration of USW-DSS Build 3 FCR-1 to a cloud-based development environment. | | | | | |
| ***FY 2020 Base Plans:***<br>- Complete software development, integration and test activities for additional capability drops and the final Build 3 / FCR-1 system. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3094 / *USW Decision Support* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Close-out the formal development cycle of FCR-1, culminating in and Element Certification of FCR-1.<br>- Through capability drops and demonstrations at CTF sites, gather feedback and develop system employment manuals for effective use of the system for each CTF.<br>- Begin development activities of Build 3 / FCR-2 to include software development, integration and test activities and associated SETRs to monitor progress.<br>- Begin prototype efforts necessary to begin hosting USW-DSS shore-based applications in a DoD commercial cloud computing environment to meet emerging cyber requirements. Effort will support required software changes, integration with a new host computing environment, and testing in the new computing environment.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 decrease ($-0.469M) was primarily driven by the re-phasing of funding from FY 2020 to FY 2021-2022 to account for the availability of prior year execution balances, and also reflects the culmination of USW-DSS Build 3 FCR-1 integration/test efforts in FY 2019. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.294 | 9.063 | 8.594 | 0.000 | 8.594 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2176: *USW Support Equipment (N2N6/USW-DSS only)* | 10.784 | 7.305 | 6.017 | - | 6.017 | 7.262 | 8.736 | 11.786 | 12.022 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

- Hardware/Software development and integration via Navy Warfare Centers and Small Business contractors.
- Utilize SBIR funding and development efforts for open competition on capability improvements to reach TRL 5/6.
- Invest Program of Record (POR) funding into maturing Small Business and Innovative Research (SBIR) developed technologies beyond TRL 5/6 for integration into USW-DSS and TASW systems via Phase III funding.

**E. Performance Metrics**

- Deliver incremental FCRs with capabilities in high interest areas that impact Fleet metrics, such as Detect to Engage (DTE) and Fleet readiness.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3094 / *USW Decision Support* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USW-DSS H/W & S/W Development | C/CPFF | Adaptive Methods : VA | 1.592 | 0.717 | Dec 2017 | 2.416 | Dec 2018 | 2.126 | Dec 2019 | - | | 2.126 | Continuing | Continuing | Continuing |
| USW-DSS H/W & S/W Development | C/CPFF | DH Wagner : PA | 0.000 | 0.000 | | 0.400 | Jan 2019 | 0.408 | Dec 2019 | - | | 0.408 | Continuing | Continuing | Continuing |
| UISW-DSS H/W & S/W Development | WR | NSWC/Carderock : MD | 0.800 | 0.708 | Oct 2017 | 1.484 | Nov 2018 | 1.514 | Nov 2019 | - | | 1.514 | Continuing | Continuing | Continuing |
| USW-DSS H/W & S/W Development | WR | NSWC/Dahlgren : VA | 0.000 | 0.150 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| USW-DSS H/W & S/W Development | WR | NUWC/Keyport : WA | 0.300 | 0.438 | Oct 2017 | 1.139 | Nov 2018 | 1.162 | Nov 2019 | - | | 1.162 | Continuing | Continuing | Continuing |
| USW-DSS H/W & S/W Development | WR | NUWC/Newport : RI | 0.510 | 0.530 | Oct 2017 | 0.436 | Nov 2018 | 0.445 | Nov 2019 | - | | 0.445 | Continuing | Continuing | Continuing |
| USW-DSS H/W & S/W Development | C/CPFF | Progeny : VA | 1.340 | 0.781 | Feb 2018 | 1.964 | Dec 2018 | 1.941 | Dec 2019 | - | | 1.941 | Continuing | Continuing | Continuing |
| USW-DSS H/W & S/W Development | C/CPFF | UT/ARL : TX | 0.000 | 0.266 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.266 | - |
| USW-DSS H/W & S/W Development | Various | Var : Var* | 49.280 | 0.125 | Dec 2017 | 0.622 | Dec 2018 | 0.384 | Dec 2019 | - | | 0.384 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 53.822 | 3.715 | | 8.461 | | 7.980 | | - | | 7.980 | Continuing | Continuing | N/A |

**Remarks**

* Consists of multiple performing activities with funding for each not greater than $1M per year.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USW-DSS Integration and Test | C/CPFF | Adaptive Methods : VA | 0.250 | 0.200 | Dec 2017 | 0.204 | Dec 2018 | 0.208 | Dec 2019 | - | | 0.208 | Continuing | Continuing | Continuing |
| USW-DSS Integration and Test | C/CPFF | Progeny : VA | 1.000 | 0.249 | Feb 2018 | 0.254 | Dec 2018 | 0.259 | Dec 2019 | - | | 0.259 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.250 | 0.449 | | 0.458 | | 0.467 | | - | | 0.467 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604518N / *Combat Information Center Conv* | Project (Number/Name)<br>3094 / *USW Decision Support* | |

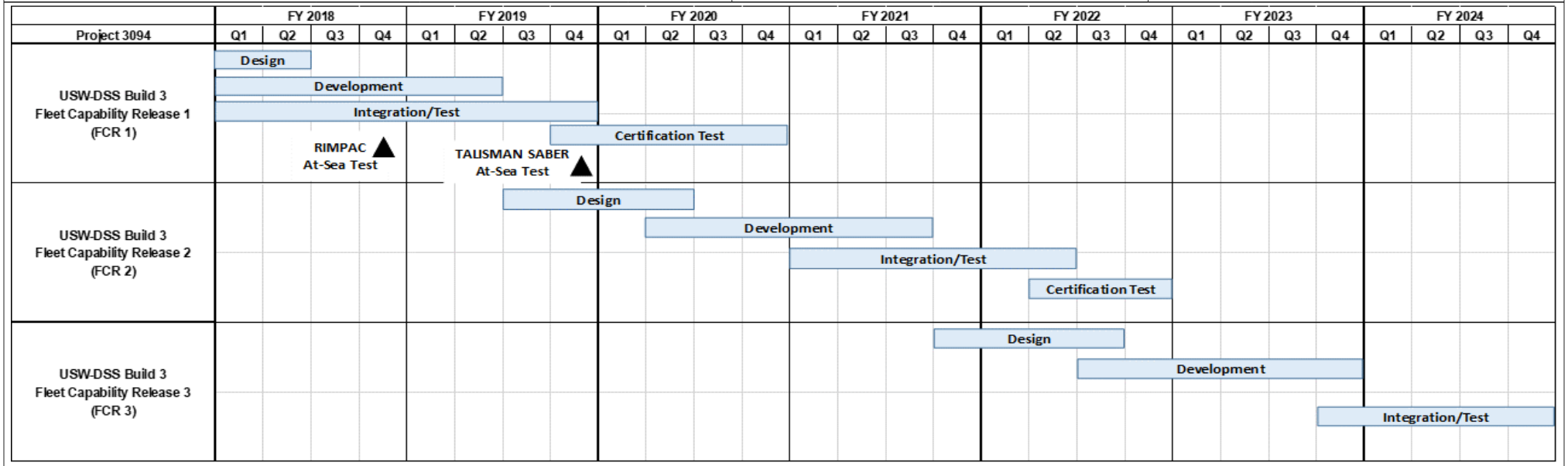
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| USW-DSS Program Management Support | C/CPFF | CACI : VA | 0.100 | 0.043 | Jan 2018 | 0.084 | Dec 2018 | 0.086 | Dec 2019 | - | | 0.086 | Continuing | Continuing | Continuing |
| USW-DSS Program Management Support | C/CPFF | CGI Federal : VA | 0.200 | 0.087 | Nov 2017 | 0.040 | Nov 2018 | 0.041 | Dec 2019 | - | | 0.041 | Continuing | Continuing | Continuing |
| USW-DSS Travel | Allot | NAVSEA PEO IWS5 : DC | 0.000 | 0.000 | | 0.020 | Jan 2019 | 0.020 | Dec 2019 | - | | 0.020 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.300 | 0.130 | | 0.144 | | 0.147 | | - | | 0.147 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 55.372 | 4.294 | | 9.063 | | 8.594 | | - | | 8.594 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3094 / *USW Decision Support* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3094 / *USW Decision Support* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3094*** | | | | |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Design | 1 | 2018 | 2 | 2018 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Development | 1 | 2018 | 2 | 2019 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Integration/Test | 1 | 2018 | 4 | 2019 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): RIMPAC At-Sea Test | 4 | 2018 | 4 | 2018 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): Certification Test | 4 | 2019 | 4 | 2020 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): TALISMAN SABER At-Sea Test | 4 | 2019 | 4 | 2019 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Design | 3 | 2019 | 2 | 2020 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Development | 2 | 2020 | 3 | 2021 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Integration/Test | 1 | 2021 | 2 | 2022 |
| USW-DSS Build 3 Fleet Capability Release 1 (FCR 1): USW-DSS Build 3 Fleet Capability Release 2 (FCR 2): Certification Test | 2 | 2022 | 4 | 2022 |
| USW-DSS Build 3 / Fleet Capability Release 3 (FCR 3): Design | 4 | 2021 | 3 | 2022 |
| USW-DSS Build 3 / Fleet Capability Release 3 (FCR 3): Development | 3 | 2022 | 4 | 2023 |
| USW-DSS Build 3 / Fleet Capability Release 3 (FCR 3): Integration/Test | 4 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604518N / *Combat Information Center Conv* | Project (Number/Name)<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3439: *Project NAUTICA: Integrated Theater ASW C4I* | 0.000 | 0.000 | 10.200 | 7.500 | - | 7.500 | 3.400 | 1.000 | 1.100 | 1.122 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Effective FY 2019, a new initiative titled Networked Architecture for Undersea Theater Integrated C2 Advantage (NAUTICA) was established for TUSW architecture development, systems engineering, and design. NAUTICA integrates intelligence (operational and tactical) and sensor (national and organic) systems to provide a fully informed COP of enemy undersea forces, maximizing decision superiority and theater level planning, and address TUSW C2.

The Navy plan for NAUTICA was approved by the June 2017 Flag Oversight Board and subsequently a roadmap was developed in FY 2018. The TUSWOC's systems today are not integrated to support performance requirements during all threat levels. This results in failure to most effectively employ Theater USW assets. Near term, FY 2019 accelerates development by rapid prototyping the framework for existing legacy systems to be federated to be exchange key information and significantly improve existing TUSW capability.

FY 2019 initiates the system engineering effort required to design, develop and deliver an integrated TUSW battle management suite in accordance with the 2007 ASW ICD. The plan prioritizes NAUTICA investments in accordance with the Commander U.S. Fleet Forces endorsement of "Theater ASW Capability Requirements" letter (dated 24 February 2017). The design of the integrated TUSW battle management suite will include a system of systems TUSW architecture to enable the existing programs of record under development from PEO IWS, PEO C4I, PEO AIR, and N9SP to exploit a common framework in the FYDP. The common architecture will define the key data exchanges, common displays and processing, data models, cross domain interfaces, and multi-level security software that will enable systems such as DCGS-N and USW-DSS to exchange, display and exploit information at the appropriate classifications.

Funding under this project will also establish a transition path for new technologies such as the Operational Planning Tool (OPT), Water Space Planner (WASP), Battle Management TDA, and other Future Naval Capabilities (FNCs) that will start to transition Technology Readiness Level (TRL) 5/6 enabling technologies into the USW-DSS and DCGS-N Programs of Record (PORs).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** NAUTICA - Theater Architecture Development and System Integration | 0.000 | 10.200 | 7.500 | 0.000 | 7.500 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** FY 2019 initiates the analysis of the TASW Command Center system of systems design and planning. The effort will make specific recommendations for the design and development of the interfaces and test procedures for the systems being developed under separate Programs of Record. Specifically, the | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| GCCS-M, USW DSS, DCGS-N, Maritime Tactical Command & Control-2 (MTC-2) systems have evolved on separate timelines. The funding will develop near term solutions and propose a long range plan for the systems. The investment will, as a first step, design the interfaces that will federate the systems to close the gaps. The objective is to replace the manpower intense operations with machine to machine interfaces, and then assess the warfighting benefit of integration to inform future decisions. This investment addresses TASW C2 needs identified in the ASW ICD.<br><br>***FY 2019 Plans:***<br>- Complete Systems Engineering Top-Down Design for NAUTICA.<br>- Complete requirements definition, requirements analysis, and architecture design.<br>- Develop Requirements Definition Package (RDP).<br>- Develop and approve Systems Engineering Plan (SEP) in accordance with the Defense Acquisition Guidebook (DAG).<br>- Development the battle management suite architecture.<br>- Establish a transition plan for Office of Naval Research (ONR) Future Naval Capabilities (FNCs) such as Water Space Management and Battlespace Awareness Tactical Decision Aids.<br>- Utilize TASW Tactical Advancements for the Next Generation (TANG) recommendations to develop prototypes form the TANG concepts for evaluation by the Fleet such as the CASEBOOK concept.<br>- Design and develop the data exchanges necessary between systems to support early incorporation of P-8 data onto the TASW Command Center.<br>- Define and/or design the common framework of displays, processing & storage, boundary defense, network, communication systems, and cyber security that will allow federation of existing systems and insertion of new capabilities to enable more effective employment of Theater USW assets.<br>- Deliver an Advanced Engineering Development model of the common framework to a CTF.<br>- Develop the software development kit for applications be developed to run on the battle management suite.<br>- Define the System of System testing and validation environment for applications to be rapidly approved and fielded.<br><br>***FY 2020 Base Plans:***<br>- Develop a multi-nation security release data marking and exchange plan.<br>- Design data extensions to support multi-national data display and protection.<br>- Conduct a cloud storage assessment and establish a prototype capability for testing.<br>- Conduct a cloud computing assessment and establish a prototype capability for prototyping. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Select additional TANG concepts for evaluation by the Fleet such as the SEGA concept.<br>- Incorporate additional functionality from the Theater ASW Capability Requirements" letter (dated 24 February 2017) into the Master tactical plot such as red Courses of Action.<br>- Design and develop applications to reduce track clutter such as enabling association, correlation and fusion of different POR tracks to support a master track file.<br>- Design and develop the data exchanges necessary between systems to support blue force management such as incorporation of water space management and prevention of mutual interference tools.<br>- Design and develop the data exchanges necessary between systems to support for early incorporation of Theater USW platforms such as submarines and IUSS.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 decrease ($-2.700M) reflects planned reduced systems engineering scope. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 10.200 | 7.500 | 0.000 | 7.500 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2176: *USW Support Equipment (N2N6/USW-DSS only)* | 10.784 | 7.305 | 6.017 | - | 6.017 | 7.262 | 8.736 | 11.786 | 12.022 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

- New Theater Architecture Development and System Integration initiative provides the transition funding for the ONR FNC investments, for Water Space Management and including Battlespace Management TDA.
- Capabilities developed under SBIRs and FNCs are incorporated into TASW PoRs, such as USW-DSS, through incremental FCRs.

**E. Performance Metrics**

- Measure system performance and improvement through System Qualification Testing (SQT) and evaluate the fielded system performance against approved TASW metrics derived from Systems Engineering efforts.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development/Engineering | C/CPFF | Adaptive Methods : VA | 0.000 | 0.000 | | 0.850 | Dec 2018 | 0.638 | Dec 2019 | - | | 0.638 | Continuing | Continuing | Continuing |
| Development/Engineering | WR | COMNAVAIRPAC : CA | 0.000 | 0.000 | | 0.210 | Jan 2019 | 0.158 | Nov 2019 | - | | 0.158 | Continuing | Continuing | Continuing |
| Development/Engineering | C/CPFF | DH Wagner : PA | 0.000 | 0.000 | | 0.100 | Jan 2019 | 0.075 | Dec 2019 | - | | 0.075 | Continuing | Continuing | Continuing |
| Development/Engineering | WR | NSWC/Carderock : MD | 0.000 | 0.000 | | 0.750 | Dec 2018 | 0.563 | Nov 2019 | - | | 0.563 | Continuing | Continuing | Continuing |
| Development/Engineering | WR | NSWC/Dahlgren : VA | 0.000 | 0.000 | | 0.445 | Dec 2018 | 0.334 | Nov 2019 | - | | 0.334 | Continuing | Continuing | Continuing |
| Development/Engineering | WR | NUWC/Keyport : WA | 0.000 | 0.000 | | 1.273 | Dec 2018 | 0.955 | Nov 2019 | - | | 0.955 | Continuing | Continuing | Continuing |
| Development/Engineering | WR | NUWC/Newport : RI | 0.000 | 0.000 | | 0.888 | Dec 2018 | 0.666 | Nov 2019 | - | | 0.666 | Continuing | Continuing | Continuing |
| Development/Engineering | WR | SSC : CA | 0.000 | 0.000 | | 0.280 | Jan 2019 | 0.210 | Nov 2019 | - | | 0.210 | Continuing | Continuing | Continuing |
| Development/Engineering | C/CPFF | UT/ARL : TX | 0.000 | 0.000 | | 1.774 | Dec 2018 | 1.331 | Dec 2019 | - | | 1.331 | Continuing | Continuing | Continuing |
| Development/Engineering | C/CPFF | Various : Var* | 0.000 | 0.000 | | 2.590 | Jan 2019 | 1.499 | Dec 2019 | - | | 1.499 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 9.160 | | 6.429 | | - | | 6.429 | Continuing | Continuing | N/A |

**Remarks**

* Consists of multiple performing activities with funding for each not greater than $1M per year.

**Management Services ($ in Millions)**

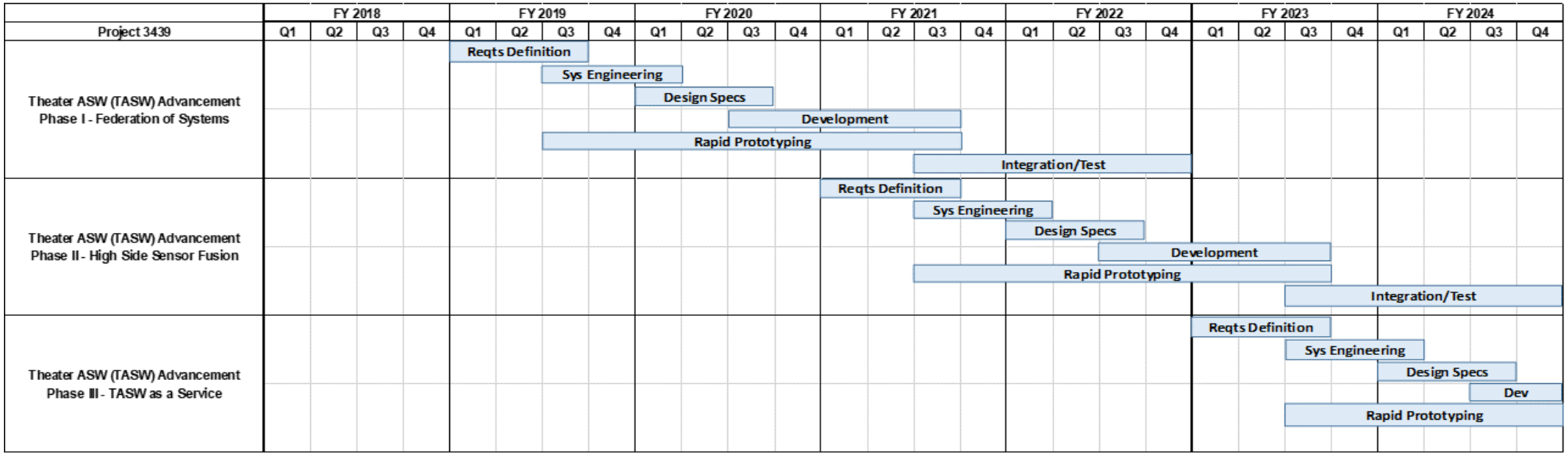
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | CACI : VA | 0.000 | 0.000 | | 0.095 | Dec 2018 | 0.097 | Dec 2019 | - | | 0.097 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | CGI Federal : VA | 0.000 | 0.000 | | 0.915 | Dec 2018 | 0.944 | Dec 2019 | - | | 0.944 | Continuing | Continuing | Continuing |
| Travel | Allot | NAVSEA PEO IWS5 : DC | 0.000 | 0.000 | | 0.030 | Jan 2019 | 0.030 | Dec 2019 | - | | 0.030 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 1.040 | | 1.071 | | - | | 1.071 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604518N / *Combat Information Center Conv* | Project (Number/Name)<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 10.200 | | 7.500 | | - | | 7.500 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3439*** | | | | |
| Theater ASW (TASW) Advancement Phase I - Federation of Systems: Requirements Definition | 1 | 2019 | 3 | 2019 |
| Theater ASW (TASW) Advancement Phase I - Federation of Systems: Systems Engineering | 3 | 2019 | 1 | 2020 |
| Theater ASW (TASW) Advancement Phase I - Federation of Systems: Design Specifications | 1 | 2020 | 3 | 2020 |
| Theater ASW (TASW) Advancement Phase I - Federation of Systems: Development | 3 | 2020 | 3 | 2021 |
| Theater ASW (TASW) Advancement Phase I - Federation of Systems: Rapid Prototyping | 3 | 2019 | 3 | 2021 |
| Theater ASW (TASW) Advancement Phase I - Federation of Systems: Integration/Test | 3 | 2021 | 4 | 2022 |
| Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Requirements Definition | 1 | 2021 | 3 | 2021 |
| Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Systems Engineering | 3 | 2021 | 1 | 2022 |
| Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Design Specifications | 1 | 2022 | 3 | 2022 |
| Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Development | 3 | 2022 | 3 | 2023 |
| Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Rapid Prototyping | 3 | 2021 | 3 | 2023 |
| Theater ASW (TASW) Advancement Phase II - High Side Sensor Fusion: Integration/ Test | 3 | 2023 | 4 | 2024 |
| Theater ASW (TASW) Phase III - TASW As A Service: Requirements Definition | 1 | 2023 | 3 | 2023 |
| Theater ASW (TASW) Phase III - TASW As A Service: Systems Engineering | 3 | 2023 | 1 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604518N / *Combat Information Center Conv* | **Project (Number/Name)**<br>3439 / *Project NAUTICA: Integrated Theater ASW C4I* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Theater ASW (TASW) Phase III - TASW As A Service: Design Specifications | 1 | 2024 | 3 | 2024 |
| Theater ASW (TASW) Phase III - TASW As A Service: Development | 3 | 2024 | 4 | 2024 |
| Theater ASW (TASW) Phase III - TASW As A Service: Rapid Prototyping | 3 | 2023 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604522N *I (U)Air and Missile Defense Radar (AMDR) System* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 481.881 | 49.643 | 27.008 | 55.349 | - | 55.349 | 78.126 | 87.932 | 80.425 | 79.863 | Continuing | Continuing |
| 3186: *Air and Missile Defense Radar* | 481.881 | 49.643 | 27.008 | 55.349 | - | 55.349 | 78.126 | 87.932 | 80.425 | 79.863 | Continuing | Continuing |

**Program MDAP/MAIS Code:**
**Project MDAP/MAIS Code(s):** P384

**A. Mission Description and Budget Item Justification**

Air and Missile Defense Radar (AMDR): (NOTE: FY14 and prior year funding is in PE 0604501N) The AMDR suite is being developed to fulfill Integrated Air and Missile Defense requirements for multiple ship classes. This suite consists of an S-Band radar (AMDR-S), an X-band radar and a Radar Suite Controller (RSC). Funding will develop AMDR-S and Radar RSC, and integrate these components with an available X band radar. AMDR will provide multi-mission capabilities, simultaneously supporting both long range, exoatmospheric detection, tracking and discrimination of ballistic missiles, as well as Area and Self Defense against air and surface threats. For the Ballistic Missile Defense (BMD) capability, increased radar sensitivity and bandwidth over current radar systems are needed to detect, track and support engagements of advanced ballistic missile threats at the required ranges, concurrent with Area and Self Defense against Air and Surface threats. For the Area Air Defense and Self Defense capability, increased sensitivity and clutter capability is needed to detect, react to, and engage stressing Very Low Observable/Very Low Flyer (VLO/VLF) threats in the presence of heavy land, sea, and rain clutter. This effort provides for the development of an active phased array radar with the required capabilities to address the evolving threat. The AMDR suite will obtain performance and technology enhancements throughout its service life based upon an approach that includes modularity of hardware and software, a scalable design and Open Architecture (OA) compliance. The FY18 increase is to conduct the Mission Flight retest in Q2FY19. The FY20 and following funds are required to scale AMDR to backfit Active Electronically-Steered Array and digital beamforming technology on a Flight IIA DDG and to complete development of Advanced Distributed Radar (ADR) capability for integration into AMDR. ADR engineering development is funded to start in FY 2020. This capability will enhance BMD detection performance, increase sensitivity at large scan angles, and enable AMDR to operate in receive-only mode in cooperation with another SPY-6(V)1 radar. In addition to the BMD mission, this capability will also improve Anti-Air Warfare (AAW) warfighting capabilities and provide advanced electronic protection techniques. The program is on track to complete developmental testing and deliver to the DDG 51 Flight III.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604522N *I (U)Air and Missile Defense Radar (AMDR) System* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 32.090 | 27.059 | 26.835 | - | 26.835 |
| Current President's Budget | 49.643 | 27.008 | 55.349 | - | 55.349 |
| Total Adjustments | 17.553 | -0.051 | 28.514 | - | 28.514 |
| • Congressional General Reductions | - | -0.051 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 18.524 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.946 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 28.515 | - | 28.515 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.001 | - | -0.001 |
| • Congressional General Reductions Adjustments | -0.025 | - | - | - | - |

**Change Summary Explanation**

- Increase in FY 2018 is due to the +$18.524M reprogramming for funding of the Mission Flight Retest.
- Increase in FY 2020 is due to the $28.7000M addition of funding for Advanced Distributed Radar (ADR). FY 2020 also includes -$0.185M for Contractor Services Reform reduction.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | | | | Project (Number/Name)<br>3186 / *Air and Missile Defense Radar* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3186: *Air and Missile Defense Radar* | 481.881 | 49.643 | 27.008 | 55.349 | - | 55.349 | 78.126 | 87.932 | 80.425 | 79.863 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P384

**A. Mission Description and Budget Item Justification**

Air and Missile Defense Radar (AMDR): (NOTE: FY 2014 and prior year funding is in PE 0604501N) The AMDR suite is being developed to fulfill Integrated Air and Missile Defense requirements for multiple ship classes. This suite consists of an S-Band radar (AMDR-S), an X-band radar and a Radar Suite Controller (RSC). Funding will develop AMDR-S and RSC, and integrate these components with an available X band radar. AMDR will provide multi-mission capabilities, simultaneously supporting both long range, exoatmospheric detection, tracking and discrimination of ballistic missiles, as well as Area and Self Defense against air and surface threats. For the Ballistic Missile Defense (BMD) capability, increased radar sensitivity and bandwidth over current radar systems are needed to detect, track and support engagements of advanced ballistic missile threats at the required ranges, concurrent with Area and Self Defense against Air and Surface threats. For the Area Air Defense and Self Defense capability, increased sensitivity and clutter capability is needed to detect, react to, and engage stressing Very Low Observable/Very Low Flyer (VLO/VLF) threats in the presence of heavy land, sea, and rain clutter. This effort provides for the development of an active phased array radar with the required capabilities to address the evolving threat. The AMDR suite will obtain performance and technology enhancements throughout its service life based upon an approach that includes modularity of hardware and software, a scalable design and Open Architecture (OA) compliance. The FY 2018 increase is to conduct the Mission Flight retest in Q2 FY2019. The FY 2020 and following funds are required to scale AMDR to backfit Active Electronically-Steered Array and digital beamforming technology on a Flt IIA DDG and to complete development and integrate Advanced Distributed Radar (ADR) capability into AMDR. ADR will enhance BMD detection performance, increase sensitivity at large scan angles, and insert the core algorithms to enable AMDR to operate in receive-only mode, in cooperation with other radars. In addition to the BMD mission, this capability will also improve Anti-Air Warfare (AAW) warfighting capabilities and provide advanced electronic protection techniques. The program is on track to complete developmental testing and deliver to the DDG 51 Flight III.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** AMDR DESIGN, SUPPORT, INTEGRATION, TEST AND EVALUATION (RAYTHEON) | 32.261 | 16.397 | 14.317 | 0.000 | 14.317 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Provide engineering services support utilizing the Integration & Production Support (I&PS) contract<br>- Provide system engineering and Software (SW) support for combat system integration efforts<br>- Initiate risk reduction testing at Advanced Radar Development Evaluation Laboratory (ARDEL), including refinement of radar operation functions (calibration, fault detection/fault isolation, environmental adaptation), | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | **Project (Number/Name)**<br>3186 / *Air and Missile Defense Radar* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| improving electronic protection capabilities, and continue data collection on ballistic missile defense targets of opportunity.<br>- Complete Mission Flight Retest.<br>***FY 2020 Base Plans:***<br>- Provide engineering services support utilizing the I&PS contract<br>- Provide system engineering and SW support for combat system integration efforts<br>- Continue risk reduction testing at ARDEL, including refinement of radar operation functions (calibration, fault detection/fault isolation, environmental adaptation), improving electronic protection capabilities, and continue data collection on ballistic missile defense targets of opportunity.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY19 to FY20 is due to reduced test activities at PMRF. | | | | | |
| ***Title:*** DESIGN, SUPPORT, INTEGRATION, TEST AND EVALUATION (GOVERNMENT) | 4.792 | 7.392 | 8.247 | 0.000 | 8.247 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Support combat system integration and DDG 51 FLT III integration, including preparing for ACB 20 IPR<br>- Continue risk reduction testing at ARDEL, including refinement of radar operation functions (calibration, fault detection/fault isolation, environmental adaptation), improving electronic protection capabilities, and continued data collection on ballistic missile defense targets of opportunity.<br>- Complete Mission Flight Retest.<br>***FY 2020 Base Plans:***<br>- Assist in cost, schedule, and performance management, contract management and oversight, earned value assessment, and risk identification and mitigation<br>- Direct and lead independent technical assessments<br>- Maintain PMRF test site<br>- Provide PMRF range services in support of risk reduction testing at ARDEL<br>- Provide engineering services in support of risk reduction testing at ARDEL<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | **Project (Number/Name)**<br>3186 / *Air and Missile Defense Radar* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to minor program adjustments. | | | | | |
| ***Title:*** TEST AND EVALUATION ASSETS AND FACILITIES | 12.259 | 2.819 | 3.650 | 0.000 | 3.650 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Maintain PMRF test site<br>- Provide PMRF range services in support of risk reduction testing at ARDEL<br>- Provide engineering services in support of risk reduction and deficiency correction testing at ARDEL | | | | | |
| ***FY 2020 Base Plans:***<br>- Maintain PMRF test site<br>- Provide PMRF range services in support of risk reduction testing at ARDEL<br>- Provide engineering services in support of risk reduction a testing at ARDEL | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to the decision to keep the EDM array at ARDEL, which necessitated required maintenance and upkeep of the ARDEL test infrastructure. | | | | | |
| ***Title:*** ENGINEERING CHANGES/CAPABILITY ENHANCEMENTS | 0.000 | 0.000 | 28.700 | 0.000 | 28.700 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>- Develop Advanced Distributed Radar (ADR) program requirements<br>- Commence ADR software development, integration, testing, evaluation, and combat system integration<br>- Develop ADR specific systems engineering documents<br>- Support ADR program reviews, technical design reviews and Technical Interchange Meetings (TIMs)<br>- Form, direct, and facilitate IPTs and WGs required to support ADR integration and testing | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | **Project (Number/Name)**<br>3186 / *Air and Missile Defense Radar* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to the addition of funding for the ADR program. | | | | | |
| ***Title:*** PROGRAM MANAGEMENT | 0.331 | 0.400 | 0.435 | 0.000 | 0.435 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Provide support to combat system integration efforts<br>- Analyze and assess contractor deliverables<br>- Assist in cost, schedule, and performance management, contract management and oversight, earned value assessment and risk identification and mitigation<br>- Provide support to IPTs and WGs<br>- Award and support I&PS contract<br>***FY 2020 Base Plans:***<br>- Analyze and assess contractor deliverables<br>- Assist in cost, schedule, and performance management, contract management and oversight, earned value assessment and risk identification and mitigation<br>- Provide support to IPTs and WGs required to support I&PS contract<br>- Provide support to combat system integration efforts<br>- Support award of follow on competitive production contract<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to minor program adjustments. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 49.643 | 27.008 | 55.349 | 0.000 | 55.349 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2122: *DDG51* | 3,498.792 | 5,945.731 | 5,373.323 | - | 5,373.323 | 3,483.842 | 3,600.696 | 6,159.792 | 5,649.274 | 3,803.000 | 118,036.476 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | **Project (Number/Name)**<br>3186 / *Air and Missile Defense Radar* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Plans for the Air and Missile Defense Radar are to leverage research and development investments, integrate sufficiently matured advanced technologies from technology risk reduction efforts, and incorporate Open Architecture approaches to develop a scalable radar design with major improvements in power, sensitivity, resistance to natural and man-made environments over current radar systems for simultaneous multi-mission BMD, Area and Self Defense Anti-Air Warfare (AAW). System design will be accomplished by employing proven technologies and commercial standards to lower schedule risk and develop a product with the lowest life-cycle cost.

Program scope consists of the following phases: a Concept Studies phase; a Technology Development phase, which included competitive prototyping; an E&MD phase, which includes completion of a full EDM for land-based testing; and transition to production. The detailed scope of this acquisition is defined in the approved Milestone C AMDR Acquisition Strategy (AS).

**E. Performance Metrics**

- Complete Engineering Development Model (EDM) testing
- Achieve approval of additional Low Rate Initial Production (LRIP) options
- Conduct SVR/FCA/PRR
- Support ACB 20 and Ballistic Missile Defense (BMD) 6.X Interim Program Reviews
- Award Integration and Production Support Contract
- Mission Flight retest
- Advanced Distributed Radar (ADR) Development and Integration
- Scaled AMDR DDG51 FLT IIA Backfit

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | Project (Number/Name)<br>3186 / *Air and Missile Defense Radar* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering and Manufacturing Development/Engineering Services | C/CPIF | Raytheon : Sudbury, MA | 291.526 | 25.279 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 316.805 | - |
| Integration and Production Support | SS/FFP | Raytheon : Sudbury, MA | 0.000 | 6.982 | Dec 2018 | 16.397 | Dec 2018 | 41.917 | Oct 2019 | - | | 41.917 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 291.526 | 32.261 | | 16.397 | | 41.917 | | - | | 41.917 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | MIPR | GTRI : Atlanta, GA | 0.627 | 0.000 | | 0.280 | Jan 2019 | 0.363 | Nov 2019 | - | | 0.363 | 0.000 | 1.270 | - |
| Systems Engineering | SS/CPFF | JHU/APL : Laurel, MD | 15.397 | 1.383 | Mar 2018 | 1.179 | Jan 2019 | 1.527 | Nov 2019 | - | | 1.527 | Continuing | Continuing | Continuing |
| Systems Engineering | MIPR | MIT : Cambridge, MD | 2.078 | 0.035 | Jan 2019 | 0.820 | Jan 2019 | 1.063 | Nov 2019 | - | | 1.063 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NRL : Washington, DC | 2.647 | 0.015 | Jul 2018 | 0.198 | Dec 2018 | 0.256 | Nov 2019 | - | | 0.256 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC/CR : Crane, IN | 4.155 | 0.165 | Feb 2018 | 0.063 | Dec 2018 | 0.081 | Oct 2019 | - | | 0.081 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC/DD : Dahlgren, VA | 9.815 | 0.492 | Jan 2018 | 0.451 | Jan 2019 | 0.584 | Oct 2019 | - | | 0.584 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC/PHD : Port Hueneme, CA | 2.923 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.923 | - |
| Systems Engineering | C/CPIF | SPA (Bridge) : Washington, DC | 6.147 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.147 | - |
| Systems Engineering | MIPR | ARL : Adelphi, MD | 0.812 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.812 | - |
| Systems Engineering | WR | NSWC/CD : Carderock, MD | 0.255 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.255 | - |
| Systems Engineering | WR | NSWC/Corona : Corona, CA | 0.446 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.446 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | Project (Number/Name)<br>3186 / *Air and Missile Defense Radar* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | Allot | DISA : Scott AFB, Illinois | 0.012 | 0.004 | Oct 2017 | 0.008 | Dec 2018 | 0.010 | Nov 2019 | - | | 0.010 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC IH : Indian Head, MD | 0.611 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.611 | - |
| Systems Engineering | SS/FFP | Northrop Grumman : Baltimore, MD | 0.367 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.367 | - |
| Systems Engineering | C/FFP | DRS Power & Control Technologies, Inc. : Milwaukee, WI | 0.194 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.194 | - |
| Systems Engineering | C/CPIF | SPA : Washington, DC | 0.315 | 0.344 | Mar 2018 | 0.264 | Nov 2018 | 0.343 | Nov 2019 | - | | 0.343 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 46.801 | 2.438 | | 3.263 | | 4.227 | | - | | 4.227 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 1.142 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.142 | - |
| Test and Evaluation | MIPR | GTRI : Atlanta, GA | 0.098 | 0.000 | | 0.465 | Jan 2019 | 0.603 | Jan 2020 | - | | 0.603 | 0.000 | 1.166 | - |
| Test and Evaluation | SS/CPFF | JHU/APL : Laurel, MD | 16.359 | 1.025 | Mar 2018 | 0.142 | Jan 2019 | 0.184 | Nov 2019 | - | | 0.184 | 0.000 | 17.710 | - |
| Test and Evaluation | MIPR | MIT : Cambridge, MD | 0.284 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.284 | - |
| Test and Evaluation | WR | NAWC WD : Pt. Mugu, CA | 4.776 | 1.087 | Oct 2018 | 0.360 | Nov 2018 | 0.466 | Nov 2019 | - | | 0.466 | 0.000 | 6.689 | - |
| Test and Evaluation | WR | NRL : Washington, DC | 1.946 | 0.055 | Oct 2018 | 1.422 | Dec 2018 | 1.842 | Nov 2019 | - | | 1.842 | 0.000 | 5.265 | - |
| Test and Evaluation | WR | NSWC/DD : Dahlgren, VA | 5.098 | 0.173 | Jan 2018 | 0.278 | Jan 2019 | 0.359 | Nov 2019 | - | | 0.359 | 0.000 | 5.908 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | Project (Number/Name)<br>3186 / *Air and Missile Defense Radar* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NSWC/PHD : Port Hueneme, CA | 5.220 | 0.281 | Feb 2018 | 0.942 | Dec 2018 | 1.221 | Nov 2019 | - | | 1.221 | 0.000 | 7.664 | - |
| Test and Evaluation | WR | PMRF : Kekaha, HI | 8.602 | 2.610 | Oct 2018 | 1.138 | Jan 2019 | 1.474 | Nov 2019 | - | | 1.474 | 0.000 | 13.824 | - |
| Test and Evaluation | C/CPIF | SPA (Bridge) : Washington, DC | 3.043 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.043 | - |
| Test and Evaluation | WR | NSWC/PHD WS : Port Hueneme, CA | 78.780 | 8.046 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 86.826 | - |
| Test and Evaluation | WR | NSWC Corona : Corona, CA | 4.224 | 0.050 | Oct 2018 | 0.262 | Nov 2018 | 0.338 | Nov 2019 | - | | 0.338 | 0.000 | 4.874 | - |
| Test and Evaluation | WR | CNA-ONR : Arlington, VA | 0.146 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.146 | - |
| Test and Evaluation | C/BA | MDA : Redstone Arsenal, AL | 0.905 | 0.786 | Jan 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.691 | - |
| Test and Evaluation | C/CPIF | Engility : Andover, MA | 0.405 | 0.000 | | 0.058 | Jan 2019 | 0.074 | Nov 2019 | - | | 0.074 | 0.000 | 0.537 | - |
| Test and Evaluation | MIPR | DOI : Boise, ID | 1.173 | 0.000 | | 0.884 | Dec 2018 | 1.145 | Nov 2019 | - | | 1.145 | 0.000 | 3.202 | - |
| Test and Evaluation | WR | NSWC Crane : Crane, IN | 0.633 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.633 | - |
| Test and Evaluation | MIPR | AFSEO : Eglin AFB, FL | 0.011 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.011 | - |
| Test and Evaluation | WR | FRCE - PMA 226 : Cherry Point, NC | 0.005 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.005 | - |
| Test and Evaluation | WR | NUWC KP : Keyport, WA | 0.343 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.343 | - |
| Test and Evaluation | WR | COMNAVAIRPAC : San Diego, CA | 0.052 | 0.033 | Nov 2018 | 0.175 | Dec 2018 | 0.227 | Nov 2019 | - | | 0.227 | 0.000 | 0.487 | - |
| Test and Evaluation | WR | NSWC CD : Carderock, MD | 0.704 | 0.355 | Nov 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.059 | - |
| Test and Evaluation | MIPR | AFRL : Kirtland AFB, NM | 0.143 | 0.078 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.221 | - |
| Test and Evaluation | C/CPIF | SPA : Washington, DC | 0.194 | 0.034 | Sep 2018 | 0.822 | Dec 2018 | 0.837 | Nov 2019 | - | | 0.837 | 0.000 | 1.887 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | Project (Number/Name)<br>3186 / *Air and Missile Defense Radar* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 134.286 | 14.613 | | 6.948 | | 8.770 | | - | | 8.770 | 0.000 | 164.617 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Management Services | C/CPIF | SPA (Bridge) : Washington, DC | 5.120 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.120 | - |
| Travel | Sub Allot | PEOIWS2 : Washington, DC | 0.507 | 0.047 | Jun 2018 | 0.100 | Dec 2018 | 0.102 | Jan 2020 | - | | 0.102 | Continuing | Continuing | Continuing |
| Support Management Services | WR | NSWC/DD : Dahlgren, VA | 1.940 | 0.042 | Jan 2018 | 0.099 | Jan 2019 | 0.129 | Oct 2019 | - | | 0.129 | Continuing | Continuing | Continuing |
| Support Management Services | C/CPFF | TMB-PSS : Washington, DC | 0.256 | 0.053 | Oct 2017 | 0.042 | Aug 2019 | 0.043 | Nov 2019 | - | | 0.043 | Continuing | Continuing | Continuing |
| Support Management Services | C/CPFF | CACI-PSS : Washington, DC | 0.734 | 0.088 | Dec 2017 | 0.050 | Jan 2019 | 0.051 | Nov 2019 | - | | 0.051 | Continuing | Continuing | Continuing |
| Support Management Services | C/CPFF | STRATEGIC INSIGHT : Arlington, VA | 0.111 | 0.035 | Feb 2018 | 0.058 | Apr 2019 | 0.059 | Nov 2019 | - | | 0.059 | Continuing | Continuing | Continuing |
| Support Management Services | C/CPIF | UNC : Chapel Hill, NC | 0.098 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.098 | - |
| Support Management Services | WR | NSWC/CD : Carderock, MD | 0.072 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.072 | - |
| Support Management Services | C/CPIF | SPA : Washington, DC | 0.430 | 0.066 | Sep 2018 | 0.051 | Dec 2018 | 0.051 | Nov 2019 | - | | 0.051 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 9.268 | 0.331 | | 0.400 | | 0.435 | | - | | 0.435 | Continuing | Continuing | N/A |

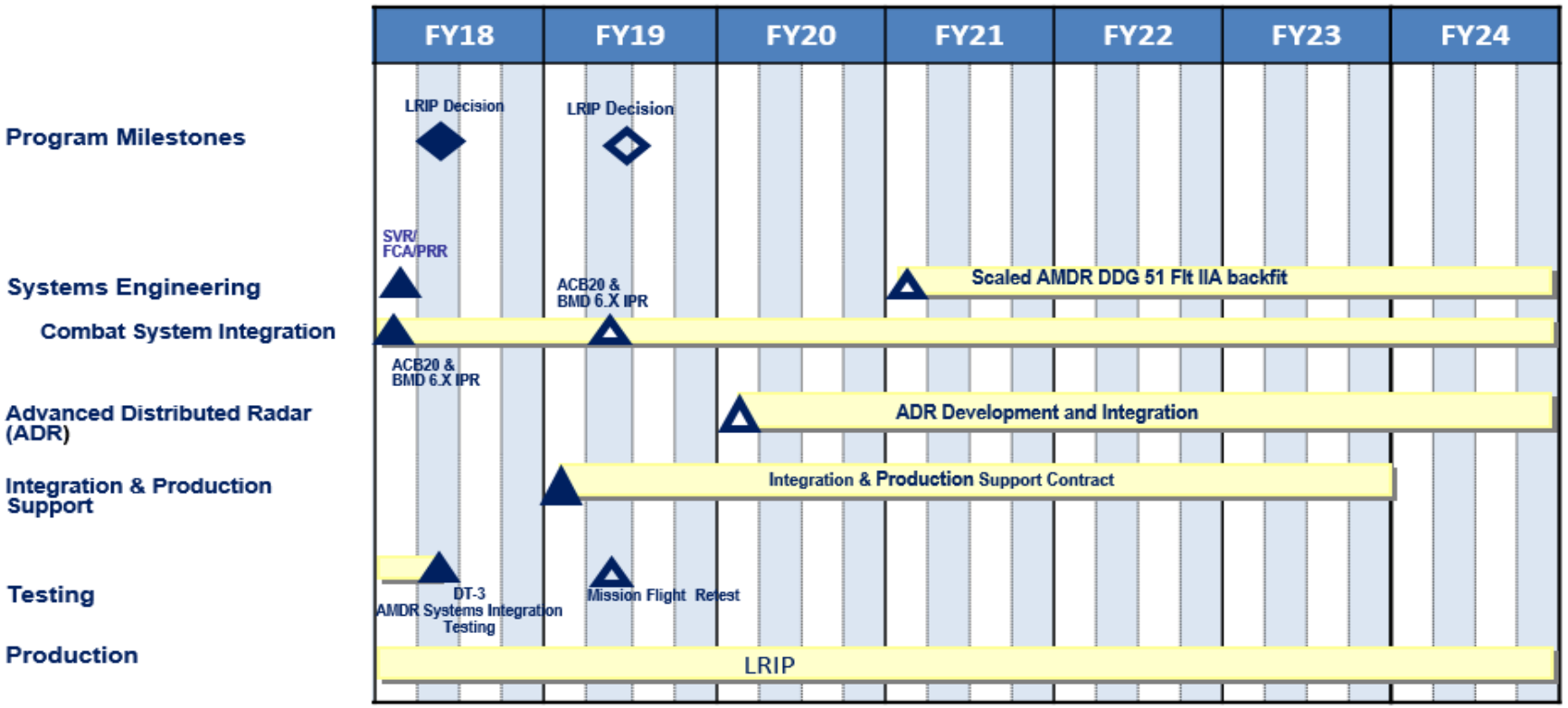
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 481.881 | 49.643 | | 27.008 | | 55.349 | | - | | 55.349 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | Project (Number/Name)<br>3186 / *Air and Missile Defense Radar* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | **Project (Number/Name)**<br>3186 / *Air and Missile Defense Radar* |




| | | | | | |
|---|---|---|---|---|---|
| ACB | Advanced Capability Build | FCA | Functional Configuration Audit | PRR | Production Readiness Review |
| BMD | Ballistic Missile Defense | IPR | Interim Program Review | SVR | System Verification Review |
| DT | Developmental Test | LRIP | Low-Rate Initial Production | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604522N / *(U)Air and Missile Defense Radar (AMDR) System* | **Project (Number/Name)**<br>3186 / *Air and Missile Defense Radar* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3186*** | | | | |
| E&MD AMDR System Integration Testing (DT-3) | 1 | 2018 | 2 | 2018 |
| System Verification Review/Functional Configuration Audit/Production Readiness Review | 1 | 2018 | 1 | 2018 |
| ACB 20 and BMD 6.X Interim Program Review (IPR) | 1 | 2018 | 1 | 2018 |
| FY18 LRIP Decision | 2 | 2018 | 2 | 2018 |
| Integration and Production Support Contract | 1 | 2019 | 4 | 2023 |
| ACB 20 and BMD 6.X IPR | 2 | 2019 | 2 | 2019 |
| Mission Flight retest | 2 | 2019 | 2 | 2019 |
| FY19 LRIP Decision | 2 | 2019 | 2 | 2019 |
| Advanced Distributed Radar (ADR) | 1 | 2020 | 4 | 2024 |
| Scaled AMDR DDG51 FLT IIA Backfit | 1 | 2021 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604530N *I (U)Advanced Arresting Gear (AAG)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 0.000 | 172.173 | 123.490 | - | 123.490 | 65.981 | 22.116 | 0.303 | 0.288 | 0.000 | 384.351 |
| 2367: *Advanced Arresting Gear* | 0.000 | 0.000 | 172.173 | 123.490 | - | 123.490 | 65.981 | 22.116 | 0.303 | 0.288 | 0.000 | 384.351 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 529 | | | | | | | | | | | | |

**Note**

FY18 and prior year funding for Advanced Arresting Gear (AAG) is funded under Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232. All Prior Years RDTEN funding for the program is $711.700M; FY17 is $100.402M; and FY18 is $166.634M.

**A. Mission Description and Budget Item Justification**

The Advanced Arresting Gear (AAG) program designs, develops, tests and fields an aircraft arrestment system to replace the legacy Mark 7 arresting gear. AAG systems will be installed on all new construction aircraft carriers. AAG will provide the U.S. Navy with improved operational capability, while reducing operating and support costs. The AAG system will recover all existing and projected carrier based tail hook-equipped air vehicles well into the 21st century.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 184.106 | 147.435 | - | 147.435 |
| Current President's Budget | 0.000 | 172.173 | 123.490 | - | 123.490 |
| Total Adjustments | 0.000 | -11.933 | -23.945 | - | -23.945 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -11.933 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | -23.986 | - | -23.986 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.041 | - | 0.041 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604530N *I (U)Advanced Arresting Gear (AAG)* |

**Change Summary Explanation**

Technical: AAG established in its own Program Element and Project Unit in FY19 and out. The Department reduced funding in FY 2020 by $23.945M for Full Envelope Testing and 3 Engine NRE. Schedule updated to reflect these changes.

Cost: N/A

Schedule: Updates include,
- The Schoolhouse Curriculum Training Start date shift from 4QFY19 to 1QFY19
- Correction of Deficiencies efforts in FY20-21
- Addition of Software J1 Regression Testing in 1QFY20, J2 Software Regression Testing in 3QFY20 and Software K Regression Testing in 4QFY20

Software Release K moved from 1QFY20 and 3QFY30 to 3QFY20 and 4QFY20
Software Release I added in 2QFY19
T-45 JCTS testing start date moved from 1QFY20 to 3QFY19
E2/C2 RALS testing end date moved 3QFY18 to 2QFY19
F/A 18 E/F/G testing end date moved 4QFY18 to 1QFY19
Hi/Lo Operating Temp moved 1QFY20 to 2QFY21
RS 105 EMP moved from 3QFY20 to 3QFY21

CVN78 Events were updated to reflect the most current Post Delivery Test & Trials (PDT&T) schedule from PMS378.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | Project (Number/Name)<br>2367 / *Advanced Arresting Gear* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2367: *Advanced Arresting Gear* | 0.000 | 0.000 | 172.173 | 123.490 | - | 123.490 | 65.981 | 22.116 | 0.303 | 0.288 | 0.000 | 384.351 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 529

**Note**

Advanced Arresting Gear (AAG) was previously funded under Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recovery project unit 2232 in FY 2018 and prior.

**A. Mission Description and Budget Item Justification**

The Advanced Arresting Gear (AAG) program will design, develop, test and field an aircraft arrestment system to replace the legacy Mark 7 arresting gear. AAG systems will be installed on all new construction aircraft carriers. AAG will provide the U.S. Navy with improved operational capability, while reducing operating and support costs. The AAG system will recover all existing and projected carrier based tail hook-equipped air vehicles well into the 21st century.

The AAG Program's SDD phase test article consists of a single wire configured aircraft arresting system, which includes associated hardware and software needed to conduct system integrated testing by arresting both dead-loads and aircraft.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Arresting Gear (AAG) Primary Hardware Development | 0.000 | 92.382 | 89.761 | 0.000 | 89.761 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue AAG System Development and Demonstration including hardware and software analysis and design efforts for system controls, electrical and mechanical components to meet the requirements of the AAG performance specification. Complete developmental component, environmental qualification testing. Complete developmental efforts including deadload and aircraft recoveries required to issue the CVN 78 Post Shakedown Availability (PSA) Aircraft Recovery Bulletins (ARB). Complete requirements verification efforts necessary to certify the AAG System. Continue the development of AAG logistics products including the Final Interactive Electronic Technical Manual In Process Review and issuance. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue AAG System Development and Demonstration including hardware and software analysis and design efforts for system controls, electrical and mechanical components to meet the requirements of the AAG performance specification. Complete developmental component, environmental and shock qualification testing. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | **Project (Number/Name)**<br>2367 / *Advanced Arresting Gear* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete developmental efforts including deadload and aircraft recoveries required to issue the Barricade and T-45 Aircraft Recovery Bulletins (ARB). Complete requirements verification efforts necessary to certify the AAG System. Continue the development of AAG logistics products including the Final Interactive Electronic Technical Manual In Process Review and issuance.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease from FY 2019 to FY 2020 is due to the completion of deadload and aircraft recovery testing that completed and were required to issue the CVN 78 Post Shakedown Availability (PSA) Aircraft Recovery Bulletin (ARB). Additionally, software release J was separated into two releases; J1 and J2. J1 was accelerated into FY 2019, and only one event for software release J2 remains in FY 2020. Software release L was removed. | | | | | |
| ***Title:*** Advanced Arresting Gear Test & Evaluation | 0.000 | 50.116 | 12.037 | 0.000 | 12.037 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Perform Integrated Test and Evaluation (IT&E) for AAG barricade testing, T-45 Aircraft Compatibility Testing. Develop IT&E test plans, procure hardware to support barricade testing. Initiate barricade testing at the Jet Car Track Site (JCTS) for the issuance of the barricade ARB in FY20. Initiate Dynamic Control System (DCS) software development tests in support of T-45 testing. Initiate the installation of T-45 aircraft test instrumentation in preparation for manned aircraft arrestment testing at the Runway Arrested Landing Site (RALS).<br>***FY 2020 Base Plans:***<br>Deliver a completed Barricade Test ARB. Complete T-45 aircraft Compatibility Testing at the RALS and deliver a completed ARB. Begin Regression deadload testing required to verify/validate software after each release prior to shipboard use. Includes site preparations, loading of software, charge and dumps, Purchase Cable state change pullouts and retracts, spin testing, and deadload testing to verify functionality and compatibility<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | **Project (Number/Name)**<br>2367 / *Advanced Arresting Gear* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The decrease from FY 2019 to FY 2020 is due to the removal of Full Envelope Testing, the removal of software development and testing associated with the system's current three wire design, and reduction of development and test work required as the system reaches increased maturity. | | | | | |
| ***Title:*** Advanced Arresting Gear Depot Planning | 0.000 | 14.229 | 9.008 | 0.000 | 9.008 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Begin the development of the required processes and procedures to plan for Depot level activities (i.e. Depot Interactive Electronic Technical Manuals (IETM) and Depot Task Analysis). Initiate the planning and analysis necessary to standup AAG Depot Level maintenance, overhaul and repair facility/facilities for AAG components. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete the development of the required processes and procedures to plan for Depot level activities. Complete the planning and analysis and verify the material necessary to standup AAG Depot Level maintenance, overhaul and repair facility/facilities for AAG components. Perform the Depot Facility Business Case Analysis to ensure the most effective/efficient depot business operation is established for AAG. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease from FY 2019 to FY 2020 is due to the completion of Depot level development activities leading to the verification of developed material in FY 2020. | | | | | |
| ***Title:*** Advanced Arresting Gear Software Support Activity (SSA) | 0.000 | 11.468 | 3.766 | 0.000 | 3.766 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Initiate the establishment of an Organic Software Support Activity (SSA) for modifications to the system's software following initial fielding. Initiate the design and development of laboratory hardware necessary to establish an organic software development and test capability. Begin the development of organic software development, test, release and quality assurance processes. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | **Project (Number/Name)**<br>2367 / *Advanced Arresting Gear* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue the design and development of laboratory hardware necessary to establish an organic software development and test capability. Continue the development of organic software development, test, release and quality assurance processes. Begin the delivery, installation and set up of the Software Support Activity (SSA).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease from FY 2019 to FY 2020 is due to the completion of a significant portion of the design and development efforts for the lab hardware required for SSA. | | | | | |
| ***Title:*** Advanced Arresting Gear Training | 0.000 | 3.978 | 8.918 | 0.000 | 8.918 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue the Formal Training System Development. Begin the Schoolhouse Training system development of the AAG Multipurpose Reconfigurable Training System (MRTS) necessary for the Center for Naval Aviation Technical Training (CNATT) to declare Ready For Training (RFT) in FY22. Initiate schoolhouse training curriculum development.<br>***FY 2020 Base Plans:***<br>Continue the Formal Training System Development. Continue the Schoolhouse Training system development of the AAG Multipurpose Reconfigurable Training System (MRTS) necessary for the Center for Naval Aviation Technical Training (CNATT) to declare Ready For Training (RFT) in FY22. Continue the schoolhouse training curriculum development necessary for CNATT instructors to deliver training to the fleet sailors along with the MRTS training system.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase from FY 2019 to FY2020 supports the Schoolhouse Training system development of the AAG Multipurpose Reconfigurable Training System (MRTS). | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 172.173 | 123.490 | 0.000 | 123.490 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | **Project (Number/Name)**<br>2367 / *Advanced Arresting Gear* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4217: *Advanced Arresting Gear (AAG)* | 10.900 | 11.054 | 4.725 | - | 4.725 | 3.118 | 2.442 | 2.491 | 2.540 | 262.094 | 299.364 |
| • SCN/2001: *Carrier Replacement Program* | 4,130.704 | 1,573.181 | 2,347.000 | - | 2,347.000 | 2,644.700 | 2,323.613 | 1,929.000 | 1,718.000 | 8,634.858 | 47,926.932 |

**Remarks**

**D. Acquisition Strategy**

The Navy competitively awarded two Cost Plus Fixed Fee Technical Development phase contracts to develop the Advanced Arresting Gear (AAG) system. Upon completion of the Preliminary Design and Integrated Baseline reviews, the Navy awarded a single Cost Plus Award Fee option to General Atomics for the System Development and Demonstration (SDD) phase to develop and demonstrate a production representative AAG at the NAVAIR Lakehurst Jet Car Track Site and Runway Arrested Landing Site. Continuing development on the SDD contract awarded in 2004.

**E. Performance Metrics**

Will complete System Development and Demonstration integrated testing at Jet Car Track Site and Runway Arrested Landing Site. AAG will demonstrate its key performance parameters and readiness for operational test.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | Project (Number/Name)<br>2367 / *Advanced Arresting Gear* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Development | C/CPAF | General Atomics : San Diego, CA | 0.000 | 0.000 | | 87.150 | Oct 2018 | 62.176 | Nov 2019 | - | | 62.176 | 16.299 | 165.625 | 165.625 |
| Primary HW Development | C/CPAF | ESL : Cranston, RI | 0.000 | 0.000 | | 2.714 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.714 | 2.714 |
| Primary HW Development | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 24.226 | Dec 2018 | 19.051 | Nov 2019 | - | | 19.051 | 8.713 | 51.990 | - |
| Systems Engineering | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 6.995 | Nov 2018 | 3.085 | Nov 2019 | - | | 3.085 | 2.525 | 12.605 | - |
| Training Development | TBD | TBD : TBD | 0.000 | 0.000 | | 3.640 | Mar 2019 | 7.032 | Nov 2019 | - | | 7.032 | 0.840 | 11.512 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 124.725 | | 91.344 | | - | | 91.344 | 28.377 | 244.446 | N/A |

**Remarks**

Updated Primary HW Development for NAWCAD Lakehurst, NJ to move the Integrated Test and Evaluation (IT&E) support from the Product Development section to the Test & Evaluation section.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 4.483 | Dec 2018 | 1.863 | Nov 2019 | - | | 1.863 | 0.385 | 6.731 | - |
| Government Engineering Support | WR | Various : Various | 0.000 | 0.000 | | 0.425 | Nov 2018 | 0.412 | Nov 2019 | - | | 0.412 | 0.414 | 1.251 | - |
| Training Support | WR | NAWCAD : Orlando, FL | 0.000 | 0.000 | | 0.338 | Nov 2018 | 1.886 | Nov 2019 | - | | 1.886 | 0.390 | 2.614 | - |
| Software Development | TBD | General Atomics : San Diego, CA | 0.000 | 0.000 | | 9.174 | Feb 2019 | 4.366 | Nov 2019 | - | | 4.366 | 2.100 | 15.640 | 15.640 |
| Government Engineering Support | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 5.851 | Feb 2019 | 5.928 | Nov 2019 | - | | 5.928 | 5.558 | 17.337 | - |
| Depot Planning | TBD | General Atomics : San Diego, CA | 0.000 | 0.000 | | 10.672 | Mar 2019 | 6.846 | Nov 2019 | - | | 6.846 | 5.200 | 22.718 | 22.718 |
| | | **Subtotal** | 0.000 | 0.000 | | 30.943 | | 21.301 | | - | | 21.301 | 14.047 | 66.291 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | Project (Number/Name)<br>2367 / *Advanced Arresting Gear* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T&E | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 15.717 | Dec 2018 | 7.150 | Nov 2019 | - | | 7.150 | 15.334 | 38.201 | - |
| Operational T&E | WR | Various : Various | 0.000 | 0.000 | | 0.312 | Nov 2018 | 0.305 | Nov 2019 | - | | 0.305 | 0.370 | 0.987 | - |
| Integrated Test & Evaluation | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 0.000 | Dec 2018 | 3.075 | Nov 2019 | - | | 3.075 | 30.250 | 33.325 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 16.029 | | 10.530 | | - | | 10.530 | 45.954 | 72.513 | N/A |

**Remarks**

Moved Integrated Test & Evaluation (IT&E) support from Product Development to the Test & Evaluation section.

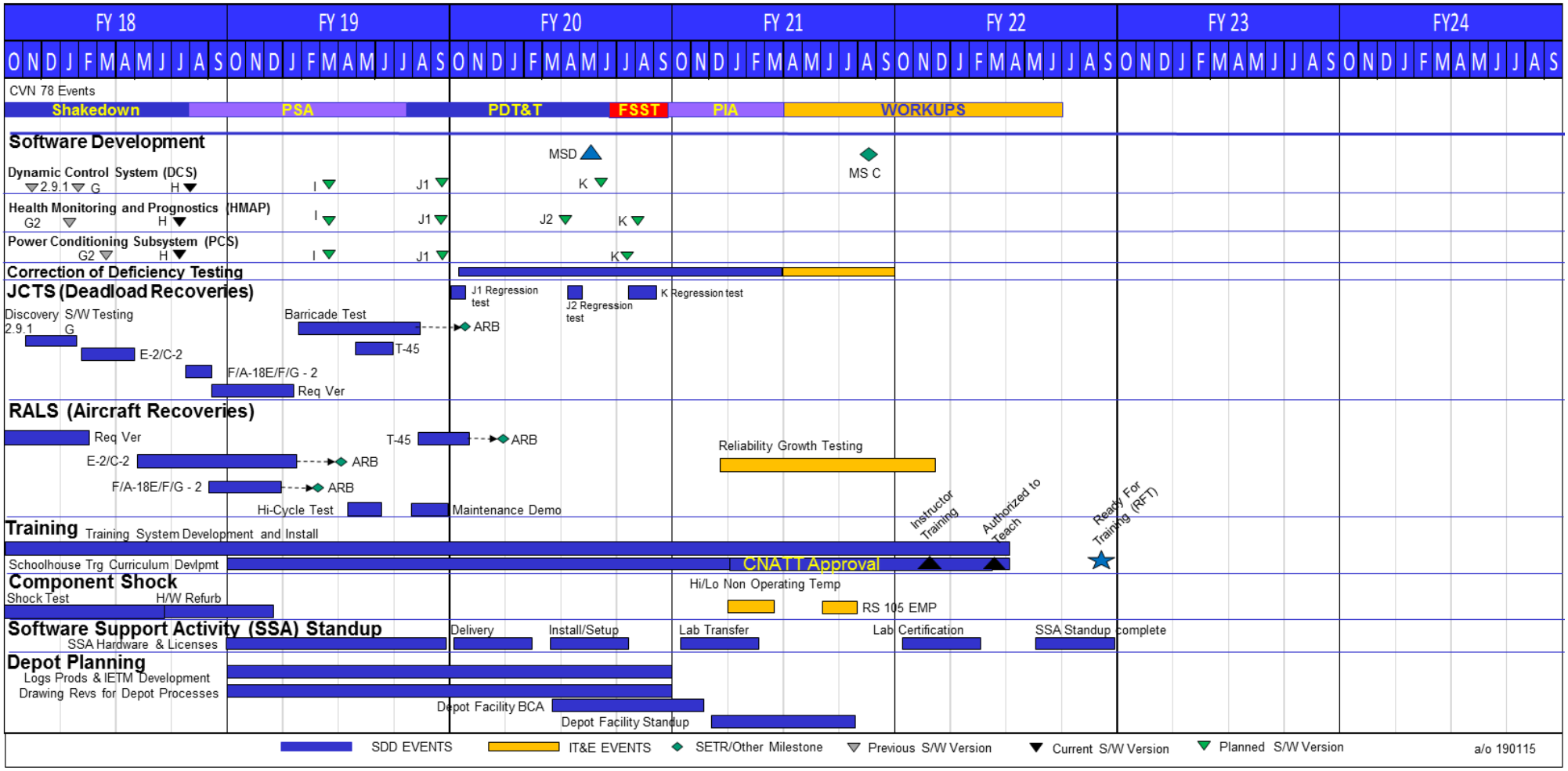
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Mgmt Support | C/CPFF | Sierra Management & Technologies : California, MD | 0.000 | 0.000 | | 0.306 | Nov 2018 | 0.215 | Nov 2019 | - | | 0.215 | 0.275 | 0.796 | 0.796 |
| Travel | Various | Various : Various | 0.000 | 0.000 | | 0.042 | Oct 2018 | 0.025 | Oct 2019 | - | | 0.025 | 0.035 | 0.102 | - |
| Program Management Support | WR | Various : Various | 0.000 | 0.000 | | 0.128 | Nov 2018 | 0.075 | Nov 2019 | - | | 0.075 | 0.000 | 0.203 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.476 | | 0.315 | | - | | 0.315 | 0.310 | 1.101 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 172.173 | | 123.490 | | - | | 123.490 | 88.688 | 384.351 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | **Project (Number/Name)**<br>2367 / *Advanced Arresting Gear* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604530N / *(U)Advanced Arresting Gear (AAG)* | **Project (Number/Name)**<br>2367 / *Advanced Arresting Gear* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***ADVANCED ARRESTING GEAR (AAG)*** | | | | |
| Acquisition Milestones: Milestones: Milestone C | 4 | 2021 | 4 | 2021 |
| Test & Evaluation: Technical Evaluation: Jet Car Test Site (JCTS) Test | 1 | 2018 | 1 | 2020 |
| Test & Evaluation: Technical Evaluation: Runway Arrested Landing Site Test (RALS) | 1 | 2018 | 1 | 2022 |
| Test & Evaluation: Technical Evaluation: Training Systems Development | 1 | 2018 | 3 | 2022 |
| Test & Evaluation: Technical Evaluation: Depot Planning | 1 | 2019 | 4 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604558N *I New Design SSN* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 2,341.657 | 117.887 | 180.233 | 121.010 | - | 121.010 | 201.638 | 248.406 | 277.648 | 283.190 | Continuing | Continuing |
| 1947: *New Design SSN HM&E* | 1,551.584 | 81.462 | 104.968 | 80.405 | - | 80.405 | 162.514 | 208.425 | 236.878 | 241.605 | Continuing | Continuing |
| 1950: *New Design SSN Combat Sys Dev* | 747.831 | 33.767 | 40.604 | 37.485 | - | 37.485 | 36.341 | 37.138 | 37.869 | 38.626 | Continuing | Continuing |
| 3062: *Submarine Multi-Mission Team Trainer* | 42.242 | 2.658 | 2.661 | 3.120 | - | 3.120 | 2.783 | 2.843 | 2.901 | 2.959 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 32.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 32.000 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 516 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The VIRGINIA Class Submarine, formerly the New Attack Submarine (New SSN), is being designed to fulfill this need. It will counter the potential threats of the next century in a multi- mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing cost reduction, producibility improvement, and technical risk management. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the VIRGINIA Class Submarine and build its Command, Control, Communications, and Intelligence (C3I) System. This PE directly supports the following VIRGINIA Class Submarine missions: (1) covert strike warfare (STRIKE); (2) anti-submarine warfare (ASW); (3) covert intelligence collection/surveillance (ISR), indication and warning (I&W), and electronic warfare (EW); (4) anti-surface ship warfare (ASUW); (5) special warfare; (6) covert mine warfare; and (7) battle group support.

| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| Previous President's Budget | 120.087 | 148.233 | 118.539 | - | 118.539 |
| Current President's Budget | 117.887 | 180.233 | 121.010 | - | 121.010 |
| Total Adjustments | -2.200 | 32.000 | 2.471 | - | 2.471 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 32.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 1.800 | 0.000 | | | |
| • SBIR/STTR Transfer | -4.001 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 3.157 | - | 3.157 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604558N *I New Design SSN* | | | |
| • Rate/Misc Adjustments | 0.001 | 0.000 | -0.686 | - | -0.686 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *New Design SSN SBIR (Cong)* | 0.000 | 20.000 |
| Congressional Add: *New Design SSN* | 0.000 | 12.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 32.000 |
| Congressional Add Totals for all Projects | 0.000 | 32.000 |

**Change Summary Explanation**

FY18 budget increased by $1.800M to fund implementation of Stern Area System
FY19 budget increased by $32.000M for Congressional adds
FY20 budget increased by $2.471M: +$2.850M to fund Test and Evaluation of South Dakota Insertion Program (SDIP) to meet Warfare Requirements by incorporating new state of the art technologies on a full scale platform to demonstrate the operation and effectiveness of the technologies (project 1947); + $.400M for Sub launched harpoon transfer from PMA201 to NAVSEA (project 3062); -$0.093M for other minor program changes; and -$.686M for miscellaneous rate adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | | | | Project (Number/Name)<br>1947 / *New Design SSN HM&E* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1947: *New Design SSN HM&E* | 1,551.584 | 81.462 | 104.968 | 80.405 | - | 80.405 | 162.514 | 208.425 | 236.878 | 241.605 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 516

**A. Mission Description and Budget Item Justification**

This project encompasses all the ship system development efforts for the VIRGINIA Class Submarine and the Technology Insertion Program for reducing costs and upgrading performance of future hulls by virtue of improvements in ship systems. Technology development implementation and logistics for developmental items, and VIRGINIA Class test & evaluation are included. The thrust of these efforts will be to develop and apply multiple advanced system technologies which are integrated into the design of the VIRGINIA Class Submarine. Technologies developed in this program will be considered for applicability to the COLUMBIA Program (CLB) for commonality opportunities. New technologies are being transitioned from industry and government research and development programs where doing so offers substantial performance improvement and/or affordability payoffs. Transition opportunities include those from the Defense Advanced Research Projects Agency (DARPA) and Office of Naval Research (ONR) Future Naval Capabilities Program.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** New Design SSN HM&E | 77.743 | 100.897 | 73.479 | 0.000 | 73.479 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Complete detailed planning for SDIP as part of planned PSA.<br>-Commence PSA and begin installation of SDIP components and modifications.<br>-Following pre-PSA ship trials, evaluate performance suitability of Improved Advance Hybrid (IAH) propulsor<br>-Further develop design details for SDIP technologies insertion into the VIRGINIA Class baseline for Block V.<br>-Finalize design integration and coordinate installation of SAS prototype into planned PSA per agreement with ONR and OPNAV.<br>-Continue development of HM&E systems concepts, technologies and obsolescence redesign for integration into VIRGINIA Class Block V Technical Baseline.<br>-Continue efforts based on OPNAV direction for integrating advanced payload systems into VIRGINIA Class platforms. Expand the scope of these efforts to include various options for leveraging increased vertical payload volume commensurate with insertion of VPM into Block V.<br>-Initiate design efforts to re-introduce Special Operations Forces (SOF) capabilities into Future VIRGINIA Class hulls (including BLK V).<br>-Initiate development of possible design options to support the Tactical Submarine Evolution Plan (TSEP). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue transition of products from the Office of Naval Research Manufacturing Technology Program (MANTECH).<br>-Continue the transition of products from ONR FNC Programs.<br><br>***FY 2020 Base Plans:***<br>-Complete PSA and installation of SDIP components and modifications.<br>-Complete SAS integration and installation during PSA.<br>-Complete design details for SDIP Technologies' insertion into the VIRGINIA Class baseline for Block V.<br>-Continue development of HM&E systems concepts, technologies including obsolescence redesign for integration into VIRGINIA Class Block V Technical Baseline.<br>-Continue efforts based on OPNAV direction for integrating advanced payload systems and SOF capabilities into VIRGINIA Class platforms.<br>-Continue efforts to include various options for leveraging increased vertical payload volume commensurate with insertion of VPM into Block V and other concepts beyond Block V for host ship interaction with large volume UUVs.<br>-Continue development of design options to support TSEP.<br>-Continue transition of products from the Office of Naval Research Manufacturing Technology Program (MANTECH).<br>-Continue the transition of products from ONR FNC Programs.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 decrease due to the bulk of SDIP installation being funded in FY 2019. | | | | | |
| ***Title:*** TEST AND EVALUATION | 3.719 | 4.071 | 6.926 | 0.000 | 6.926 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Continue work associated with previous test events (IOT&E, Arctic, Low Frequency Active, Dry-Deck Shelter, Block III FOT&E). This consists of documenting and testing fixes to deficiencies identified during previously completed Developmental and Operational Testing as well as addressing recommendations noted by the Oversight Community from OSD.<br>-Complete and publish all final reports associated with the Block III FOT&E test events.<br>-Finalize test plans to conduct Pre-PSA test and evaluation of Acoustic Superiority insertions to meet current and future warfare requirements. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue efforts to develop the FOT&E plan, to include the Cybersecurity test strategy, for Block V. The Cybersecurity test strategy will be planned and executed in coordination with the USS COLUMBIA Class IOT&E Cybersecurity test strategy.<br>-Complete the development of the Block III Transient Shock Analysis Verification and Validation Plan.<br>-Continue efforts to conduct the Combined Shock and Submergence testing and development of the Verification and Validation Plan, as well as, development of the Block V Vulnerability Assessment Report to meet the LFT&E legislation mandated in Title 10 USC 2366. | | | | | |
| ***FY 2020 Base Plans:***<br>-Continue work associated with previous test events (IOT&E, Arctic, Low Frequency Active, Dry-Deck Shelter, Block III FOT&E). This consists of documenting and testing fixes to deficiencies identified during previously completed Developmental and Operational Testing as well as addressing recommendations noted by the Oversight Community from OSD.<br>-Analyze the data, and publish the reports, from the PCU SOUTH DAKOTA (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance. These trials will consist of a Weapon System Accuracy Trial (WSAT 1), an Acoustic Trial (Actrl 1), an Underwater Electromagnetic Trial (UEM 1), and a Hydrodynamic Performance Trial (HPT 1). This information derived will be used to fully develop the next phase of testing which will be accomplished post-PSA. This post-PSA phase will include a Weapon System Accuracy Trial (WSAT 2), an Acoustic Trial (Actrl 2), an Underwater Electromagnetic Trial (UEM 2), and a Hydrodynamic Performance Trial (HPT 2). The post-PSA trials will be modified to ensure the full evaluation of the technology insertion changes that were made during PSA is done without repeating testing accomplished during the pre-PSA trials.<br>-Finalize plans for the test and evaluation phase of the Acoustic Superiority initiatives to meet current and future warfare requirements.<br>-Continue efforts to develop the FOT&E plan, to include the Cybersecurity test strategy, for Block V. The Cybersecurity test strategy will be planned and executed in coordination with the USS COLUMBIA Class IOT&E Cybersecurity test strategy.<br>-Complete the development of the Combined Shock and Submergence Test Report and Verification and Validation Report.<br>-Continue development of the Block V Transient Shock Analysis Verification and Validation Plan, as well as, the Block V Vulnerability Assessment Report to meet the LFT&E legislation mandated in Title 10 USC 2366. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 Test and Evaluation budget increased by $2.85M to Analyze the data, and publish the reports, from the PCU South Dakota (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 81.462 | 104.968 | 80.405 | 0.000 | 80.405 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *Virginia Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • OMN/0204283N: *Sub Ops & Safety* | 10.496 | 11.038 | 11.462 | - | 11.462 | 12.003 | 12.131 | 12.357 | 12.604 | Continuing | Continuing |
| • OPN/0942: *Virginia Class Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • RDTEN/0604580N: *(U)Virginia Payload Module (VPM)* | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |

**Remarks**

**D. Acquisition Strategy**

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I & II ships (SSNs 774-783) have been delivered. The first seven Block III ships, SSN 784-790, have delivered, with one remaining ship under construction. Ten Block IV ships are awarded and under construction. The program is currently negotiating the fourth MYP (Block V) contract that will include 10 SSNs (FY19-23) and will incorporate acoustic superiority modifications on all SSNs and VPM on seven SSNs with an option to award a third SSN in FY20, FY22 and FY23. The third FY20 SSN was added during the PB2020 cycle however, without Advance Procurement or Economic Order Quantity funding in prior years, it will reflect a construction schedule more in line with an FY23 SSN.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

**E. Performance Metrics**

Successful completion of the SSN 790 Baseline Assessment. SDIP design completion and installation. Design completion and integration of future payloads.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1947 / *New Design SSN HM&E* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component Development | WR | NSWC : Carderock, MD | 258.629 | 5.936 | Nov 2017 | 8.318 | Nov 2018 | 5.266 | Nov 2019 | - | | 5.266 | Continuing | Continuing | Continuing |
| Component Development | WR | NUWC : Newport, RI | 117.865 | 1.599 | Nov 2017 | 2.237 | Nov 2018 | 1.480 | Nov 2019 | - | | 1.480 | Continuing | Continuing | Continuing |
| Component Development | WR | NRL : Washington, DC | 8.530 | 0.370 | Nov 2017 | 0.516 | Nov 2018 | 0.360 | Nov 2019 | - | | 0.360 | Continuing | Continuing | Continuing |
| Component Development | C/CPFF | Electric Boat : Groton, CT | 851.997 | 67.181 | Nov 2017 | 87.117 | Nov 2018 | 64.401 | Nov 2019 | - | | 64.401 | Continuing | Continuing | Continuing |
| Component Development | SS/CPFF | Applied Research Laboratory : Penn State University | 24.188 | 1.085 | Dec 2017 | 1.520 | Dec 2018 | 0.990 | Dec 2019 | - | | 0.990 | Continuing | Continuing | Continuing |
| Component Development | SS/FP | National Shipbuilding Research Program : Not Specified | 4.739 | 0.500 | Mar 2018 | 0.500 | Mar 2019 | 0.500 | Mar 2020 | - | | 0.500 | Continuing | Continuing | Continuing |
| Component Development | Various | Miscellaneous : Not Specified | 23.951 | 0.720 | Dec 2017 | 0.689 | Dec 2018 | 0.482 | Dec 2019 | - | | 0.482 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1,289.899 | 77.391 | | 100.897 | | 73.479 | | - | | 73.479 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation - DT&E | WR | NSWC : Carderock, MD | 93.208 | 0.153 | Nov 2017 | 0.248 | Nov 2018 | 2.010 | Nov 2019 | - | | 2.010 | Continuing | Continuing | Continuing |
| Test and Evaluation - LFT&E | WR | NSWC : Carderock, MD | 4.747 | 0.530 | Nov 2017 | 0.530 | Nov 2018 | 0.650 | Nov 2019 | - | | 0.650 | 1.700 | 8.157 | - |
| Test and Evaluation - DT&E | WR | NUWC : Newport, RI | 137.655 | 0.502 | Nov 2017 | 0.501 | Dec 2018 | 0.966 | Nov 2019 | - | | 0.966 | Continuing | Continuing | Continuing |
| Test and Evaluation - OT&E | PO | COMOPTEVFOR : Norfolk, VA | 18.173 | 0.711 | Nov 2017 | 0.313 | Nov 2018 | 0.374 | Nov 2019 | - | | 0.374 | Continuing | Continuing | Continuing |
| Test and Evaluation - LFT&E | C/CPFF | Electric Boat : Groton, CT | 2.120 | 0.250 | Dec 2017 | 0.250 | Jan 2019 | 0.325 | Dec 2019 | - | | 0.325 | Continuing | Continuing | Continuing |
| Test and Evaluation - LFT&E | WR | NUWC : Newport,RI | 0.000 | 0.125 | Nov 2017 | 0.125 | Nov 2018 | 0.125 | Nov 2019 | - | | 0.125 | 0.000 | 0.375 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1947 / *New Design SSN HM&E* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation - DT&E | C/CPFF | NUWC : Newport, RI - CORE Team | 5.782 | 1.800 | Jan 2018 | 2.104 | Jan 2019 | 2.476 | Dec 2019 | - | | 2.476 | 0.000 | 12.162 | - |
| | | **Subtotal** | 261.685 | 4.071 | | 4.071 | | 6.926 | | - | | 6.926 | Continuing | Continuing | N/A |

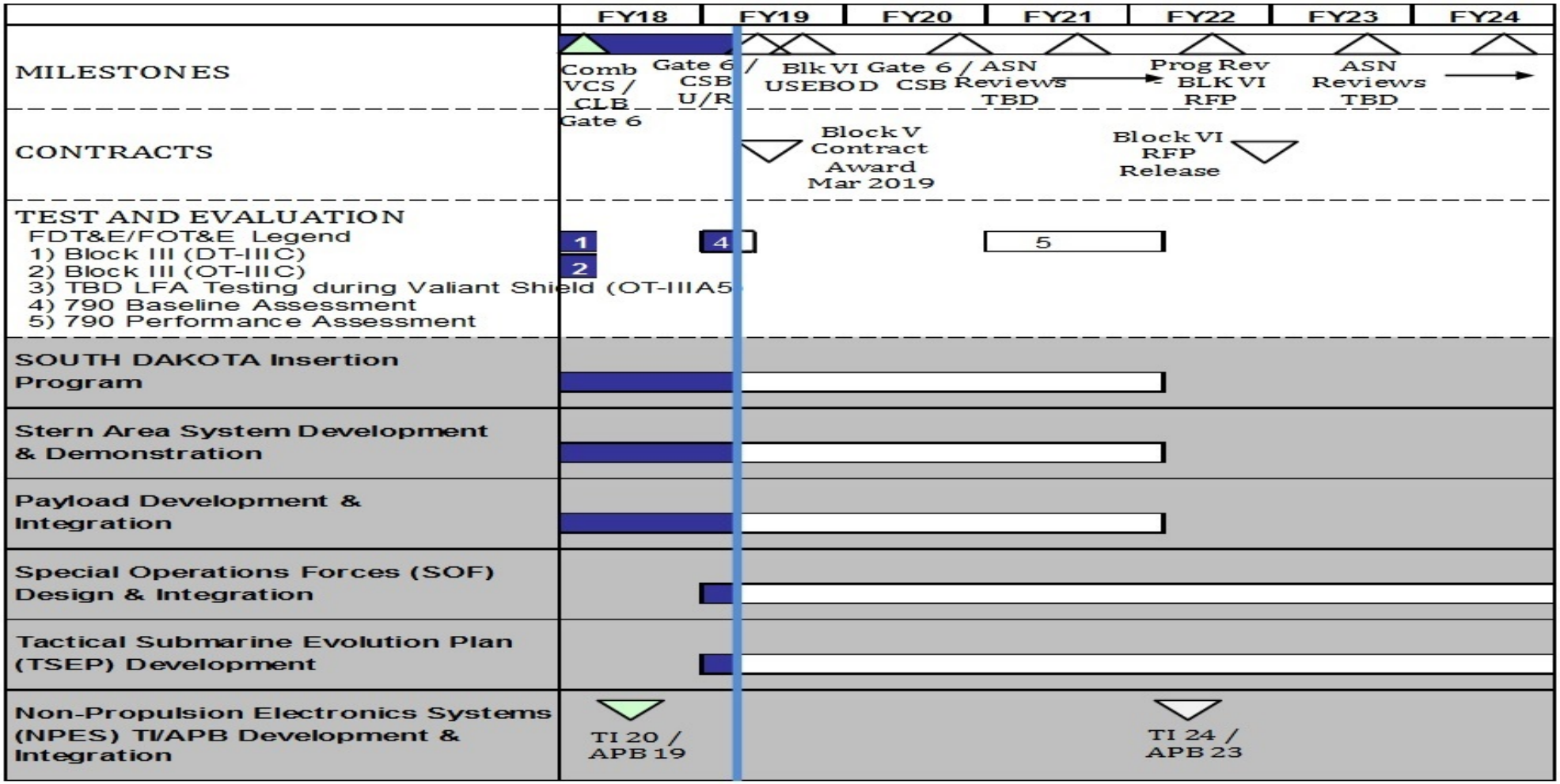
**Remarks**

FY20 Test and Evaluation budget increased by $2.85M to Analyze the data, and publish the reports, from the PCU South Dakota (SSN 790) pre-PSA new construction trials of the modified ship components, that were tested at-sea, in order to establish the baseline performance.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,551.584 | 81.462 | | 104.968 | | 80.405 | | - | | 80.405 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1947 / *New Design SSN HM&E* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1947*** | | | | |
| MILESTONE: Comb VCS/CLB Gate 6 | 1 | 2018 | 1 | 2018 |
| MILESTONE: VCS FY 19 Gate 6 U/R | 2 | 2019 | 2 | 2019 |
| MILESTONE: VCS Block VI USEBOD | 3 | 2019 | 3 | 2019 |
| MILESTONE: VCS FY 20 Gate 6 | 2 | 2020 | 2 | 2020 |
| MILESTONE: VCS FY 21 Gate 6 | 2 | 2021 | 2 | 2021 |
| MILESTONE: VCS FY 22 Gate 6 | 2 | 2022 | 2 | 2022 |
| MILESTONE: Prog Rev Block VI RFP | 3 | 2022 | 3 | 2022 |
| MILESTONE: VCS FY 23 Gate 6 | 2 | 2023 | 2 | 2023 |
| MILESTONE: VCS FY 24 Gate 6 | 2 | 2024 | 2 | 2024 |
| CONTRACTS: Block V Contract Award | 2 | 2019 | 2 | 2019 |
| CONTRACTS: Block VI RFP Release | 4 | 2022 | 4 | 2022 |
| TEST & EVALUATION: Block III (DT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: Block III (OT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: U/R 790 Baseline Assessment | 1 | 2019 | 2 | 2019 |
| TEST & EVALUATION: U/R 790 Performance Assessment | 1 | 2021 | 1 | 2022 |
| SOUTH DAKOTA Insertion Program | 1 | 2018 | 1 | 2022 |
| Stern Area System Development & Demonstration | 1 | 2018 | 1 | 2022 |
| Payload Development & Integration | 1 | 2018 | 4 | 2024 |
| Special Operations Forces (SOF) Design & Integration | 1 | 2019 | 4 | 2024 |
| Tactical Submarine Evolution Plan (TSEP) Development | 1 | 2019 | 4 | 2024 |
| Non-Propulsion Electronics Systems (NPES) TI20/APB19 Development & Integration | 1 | 2018 | 1 | 2018 |
| NPES TI24/APB23 Development & Integration | 1 | 2022 | 1 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1950 / *New Design SSN Combat Sys Dev* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950: *New Design SSN Combat Sys Dev* | 747.831 | 33.767 | 40.604 | 37.485 | - | 37.485 | 36.341 | 37.138 | 37.869 | 38.626 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 516

**A. Mission Description and Budget Item Justification**

This project provides the engineering development required to outfit each ship of the VIRGINIA Class Submarine with a combat system which satisfies ORD requirements in all 7 mission areas, namely; ASW, STRIKE, ISR, Covert Mine Warfare, Battle Group Support, ASUW, and Special Warfare. The fully integrated combat system, otherwise referred to as the Non-Propulsion Electronics System (NPES), is composed of a collection of functional sub-systems, such as sonar, navigation, exterior communications, weapons launch, Large Vertical Array, Submarine Warfare Federated Tactical System (SWFTS) virtualization, Electronic Warfare Next Generation Architecture, etc., which evolve over the life of the program due to either competitive selection of new suppliers, component obsolescence replacement, increased technical performance, or improvements in reliability. Non-recurring engineering activity is needed to perform platform integration of the components, software modification to accommodate electronic data exchange, unique submarine environment qualification and update of all logistics products.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Sonar, Combat Control, and Architecture (S/CC/A) Subsystems | 19.659 | 24.103 | 22.469 | 0.000 | 22.469 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Continue development of S/CC/A System Improvements necessary to maintain VIRGINIA Class ORD compliance, counter CYBER threats, and maintain commonality with in-service submarine designs. | | | | | |
| ***FY 2019 Plans:***<br>-Initiate TI-20 S/CC/A detailed design, programmed to be the configuration for the first 8 VCS Blk V hulls (SSN802-SSN809) and leveraged by the Columbia Class for lead ship (SSBN 826).<br>-Continue to design virtualization enabling system architectures and bench test technologies which support CYBER defense, increased suitability, rapid modernization, and affordable procurement.<br>-Conduct platform level integration testing of the first Large Vertical Array sonar sensor on SSN790 during PSA installation. | | | | | |
| ***FY 2020 Base Plans:***<br>-Initiate TI-24 S/CC/A detailed design, programmed to be the configuration for the last 2 VCS Blk V hulls (SSN810 & SSN811) and leveraged by the Columbia Class 2nd hull (SSBN 827).<br>-Complete the design of the virtualization enabling system architecture and select tested technologies which support incorporation of CYBER defense as one of the design pillars. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Complete platform level integration of the first Large Vertical Array sonar sensor on SSN790 and conduct at-sea performance testing.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Slight reduction in the budget from FY19 to FY20 reflects estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation. | | | | | |
| ***Title:*** C3I Systems Engineering | 14.108 | 16.501 | 15.016 | 0.000 | 15.016 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Conduct TI-16 integration testing of the BPS-17 Radar on SSN796 at COATS.<br>-Conduct platform level integration of the Low Profile Photonics Mast dockside on SSN794.<br>-Develop and integrate an inertial navigation system replacement to theWSN-7 Ring Laser Gyro-navigator.<br>-Initiate forward compartment SECRET level wireless Local Area Network (LAN) design.<br>***FY 2020 Base Plans:***<br>-Initiate design of next generation displays in the Command and Control Center to mitigate obsolescence risk associated with existing glass.<br>-Complete design of improved speed log automated sensor fail-over and integrate within the inertial navigation suite & NPES network.<br>-Complete design of the fiber optic backbone and Command and Control System Module (CCSM) power distribution for the virtualization enabled, CYBER hardened TI-24 and beyond architecture.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Slight reduction in the budget from FY19 to FY20 reflects estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 33.767 | 40.604 | 37.485 | 0.000 | 37.485 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *VA CL* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • O&M,N/0204283N: *Sub Ops & Safety* | 10.496 | 11.038 | 11.462 | - | 11.462 | 12.003 | 12.131 | 12.357 | 12.604 | Continuing | Continuing |
| • OPN/0942: *VA CL Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • RDT&E/0604580N: *Virginia Payload Module* | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |

**Remarks**

**D. Acquisition Strategy**

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I & II ships (SSNs 774-783) have been delivered. The first seven Block III ships, SSN 784-790, have delivered, with one remaining ship under construction. Ten Block IV ships are awarded and under construction. The program is currently negotiating the fourth MYP (Block V) contract that will include 10 SSNs (FY19-23) and will incorporate acoustic superiority modifications on all SSNs and VPM on seven SSNs with an option to award a third SSN in FY20, FY22 and FY23. The third FY20 SSN was added during the PB2020 cycle however, without Advance Procurement or Economic Order Quantity funding in prior years, it will reflect a construction schedule more in line with an FY23 SSN.

**E. Performance Metrics**

Successful completion of the SSN 790 Baseline Assessment. SDIP design completion and installation. Design completion and integration of future payloads.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1950 / *New Design SSN Combat Sys Dev* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unique Virginia Class Improvements | Various | Various : Various | 86.576 | 3.845 | Feb 2018 | 3.750 | Feb 2019 | 3.750 | Feb 2020 | - | | 3.750 | Continuing | Continuing | Continuing |
| Tech Insertion/Advanced Processing Build (TI/APB) Integration | Various | Various : TBD | 0.000 | 3.949 | Nov 2017 | 7.195 | Nov 2018 | 6.950 | Nov 2019 | - | | 6.950 | Continuing | Continuing | Continuing |
| Photonics | C/CPIF | Kollmorgen : Northampton, MA | 61.701 | 0.000 | | 0.635 | Jan 2019 | 0.808 | Jan 2020 | - | | 0.808 | 0.000 | 63.144 | - |
| Large Vertical Array South Dakota Improvement Program | Various | Various : TBD | 0.000 | 4.518 | Nov 2017 | 6.925 | Nov 2018 | 4.800 | Nov 2019 | - | | 4.800 | Continuing | Continuing | Continuing |
| Platform Integration | SS/CPFF | Electric Boat : Groton, CT | 55.010 | 2.621 | Nov 2017 | 6.370 | Nov 2018 | 6.100 | Nov 2019 | - | | 6.100 | Continuing | Continuing | Continuing |
| Photonics | C/CPIF | Lockheed Martin : Manassas, VA | 0.000 | 0.500 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Virtualization Enabling Architecture Development | Various | Various : TBD | 0.000 | 4.318 | Nov 2017 | 5.850 | Nov 2018 | 4.551 | Nov 2019 | - | | 4.551 | Continuing | Continuing | Continuing |
| Technical Direction Agent | WR | NUWC : Newport, RI | 318.178 | 5.922 | Nov 2017 | 5.174 | Nov 2018 | 5.481 | Nov 2019 | - | | 5.481 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Carderock, MD | 14.449 | 0.220 | Nov 2017 | 0.220 | Nov 2018 | 0.420 | Nov 2019 | - | | 0.420 | Continuing | Continuing | Continuing |
| Acoustic Intercept & Sonar | C/CPFF | Progeny Applied : Manassas, VA | 0.000 | 0.500 | Nov 2017 | 0.635 | Nov 2018 | 0.400 | Jan 2020 | - | | 0.400 | Continuing | Continuing | Continuing |
| High Frequency & Sonar Sensors | C/CPFF | Applied Research Lab : University of Texas | 0.000 | 0.300 | Nov 2017 | 0.400 | Nov 2018 | 0.455 | Nov 2019 | - | | 0.455 | Continuing | Continuing | Continuing |
| Next Generation Architecture - Electronic Warfare System | WR | NSMA : Various | 0.000 | 3.799 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | SSC : Charleston, SC | 9.277 | 0.800 | Nov 2017 | 1.300 | Nov 2018 | 1.345 | Nov 2019 | - | | 1.345 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NUWC : Keyport, WA | 12.785 | 0.800 | Nov 2017 | 0.650 | Nov 2018 | 0.875 | Nov 2019 | - | | 0.875 | Continuing | Continuing | Continuing |
| Miscellaneous | Various | Various : Various | 145.692 | 0.675 | Feb 2018 | 0.700 | Nov 2018 | 0.600 | Dec 2019 | - | | 0.600 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 703.668 | 32.767 | | 39.804 | | 36.535 | | - | | 36.535 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>1950 / *New Design SSN Combat Sys Dev* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Estimates associated with the time varying non-recurring developmental scope of work tied to this project, not indices tied to inflation.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Various | Various | Various : TBD | 6.212 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.212 | - |
| | | **Subtotal** | 6.212 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.212 | N/A |

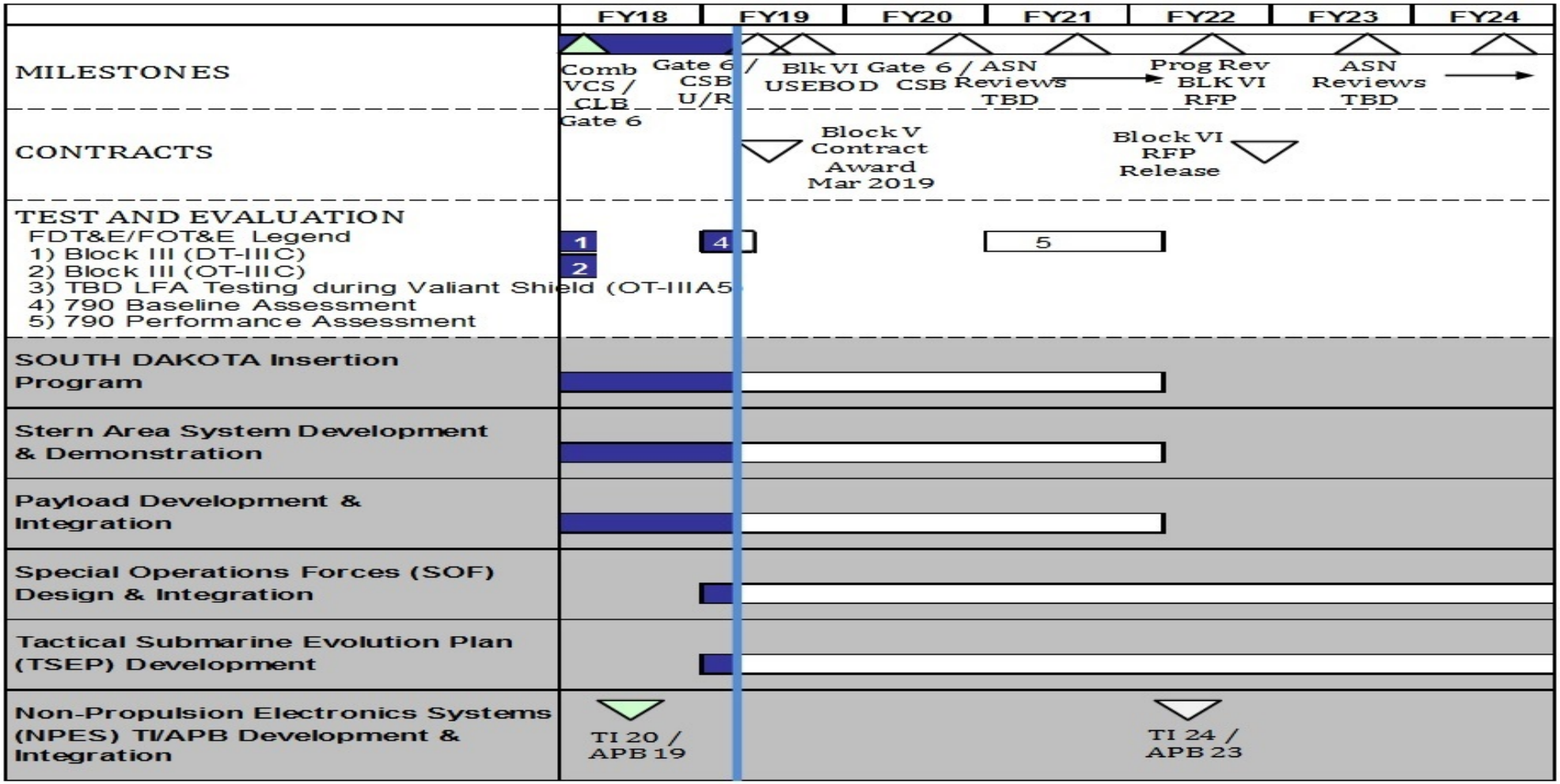
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Support Services/ETS | C/CPAF | SEAPORT : Rockville, MD | 37.756 | 1.000 | Dec 2017 | 0.800 | Dec 2018 | 0.950 | Dec 2019 | - | | 0.950 | Continuing | Continuing | Continuing |
| DAWDF | Various | Various : Various | 0.195 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.195 | - |
| | | **Subtotal** | 37.951 | 1.000 | | 0.800 | | 0.950 | | - | | 0.950 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 747.831 | 33.767 | | 40.604 | | 37.485 | | - | | 37.485 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>1950 / *New Design SSN Combat Sys Dev* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1950*** | | | | |
| MILESTONE: Comb VCS/CLB Gate 6 | 1 | 2018 | 1 | 2018 |
| MILESTONE: VCS FY 19 Gate 6 U/R | 1 | 2019 | 1 | 2019 |
| MILESTONE: VCS Block VI USEBOD | 3 | 2019 | 3 | 2019 |
| MILESTONE: VCS FY20 Gate 6 | 2 | 2020 | 2 | 2020 |
| MILESTONE: VCS FY21 Gate 6 | 2 | 2021 | 2 | 2021 |
| MILESTONE: VCS FY22 Gate 6 | 2 | 2022 | 2 | 2022 |
| MILESTONE: Prog Rev Block VI RFP | 3 | 2022 | 3 | 2022 |
| MILESTONE: VCS FY23 Gate 6 | 2 | 2023 | 2 | 2023 |
| MILESTONE: VCS FY24 Gate 6 | 2 | 2024 | 2 | 2024 |
| CONTRACTS: Block V Contract Award | 2 | 2019 | 2 | 2019 |
| CONTRACTS: Block VI RFP Release | 4 | 2022 | 4 | 2022 |
| TEST & EVALUATION: Block III (DT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: Block III (OT-IIIC) | 1 | 2018 | 1 | 2018 |
| TEST & EVALUATION: U/R 790 Baseline Assessment | 1 | 2019 | 2 | 2019 |
| TEST & EVALUATION: U/R 790 Performance Assessment | 1 | 2021 | 1 | 2022 |
| SOUTH DAKOTA Improvement Program | 1 | 2018 | 1 | 2022 |
| Stern Area System Development & Demonstration | 1 | 2018 | 1 | 2022 |
| Payload Development & Integration | 1 | 2018 | 4 | 2024 |
| Special Operations Forces (SOF) Design & Integration | 1 | 2019 | 4 | 2024 |
| Tactical Submarine Evolution Plan (TSEP) Development | 1 | 2019 | 4 | 2024 |
| Non-Propulsion Electronics Systems (NPES) TI20/APB19 Development & Integration | 1 | 2018 | 1 | 2018 |
| NPES TI24/APB 23 Development & Integration | 1 | 2022 | 1 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>3062 / *Submarine Multi-Mission Team Trainer* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3062: *Submarine Multi-Mission Team Trainer* | 42.242 | 2.658 | 2.661 | 3.120 | - | 3.120 | 2.783 | 2.843 | 2.901 | 2.959 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shore based Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment. The Combat Control System (CCS) AN/BYG-1 and sonar system AN/BQQ-10 are installed on SSN, SSBN and SSGN class submarines. These tactical systems are planned for future upgrades with the next hardware and software revisions which will provide enhanced War Fighter capabilities. The Tactical Acoustic Rapid COTS (commercial-off-the-shelf) Insertion (ARCI) phased upgrades are also being installed with future revisions. The Advanced Processing Builds (APB) and Technical Insertion (TI) sensors, which feed technology insertion into the CCS/Acoustic development, directly impact the trainers.

The Submarine Multi-Mission Team Trainer (SMMTT) supports operator, employment, strike, and Battle Group training for enlisted and officer pipelines. The SMMTT provides operators and combat teams the opportunity to train ashore, prior to, and between deployments. The shore based training provides a means of maintaining team proficiency in stand alone or in combined team mode prior to ship deployment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Submarine Multi-Mission Team Trainer | 2.658 | 2.661 | 3.120 | 0.000 | 3.120 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** To achieve desired submarine force readiness levels, it is necessary to construct highly sophisticated shore based Combat System Team Trainers capable of training personnel in all aspects of submarine approach, attack and surveillance operations in a controlled, simulated environment. | | | | | |
| ***FY 2019 Plans:***<br>Develop implementation of latest Advanced Processor Build 15 (APB15), Technical Insertion 16 (TI16) and associated training displays. These efforts include new sensor developments and simulations to match advancements in tactical systems supported by SMMTT. These efforts will also integrate the APB into the SMMTT baseline. This also includes the development and integration of APB software into the SSGN 726 build. | | | | | |
| ***FY 2020 Base Plans:***<br>Develop implementation of latest Advanced Processor Build (APB), Technical Insertion (TI) and associated training displays. These efforts include new sensor developments and simulations to match advancements | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| in tactical systems supported by SMMTT. These efforts will also integrate the APB into the SMMTT baseline along with integrating the Sonar Sensors LCCA and Large Vertical Array (LVA). FY2020 also adds Harpoon Simulation/Stimulation to the portfolio.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from $2.661 to $3.120 is due to additional funds needed to develop interfaces for LVA sensor. LVA sensor is twice size the of any previously developed sensor developments and simulations to match advancements in tactical systems supported by SMMTT. The additional funds also adds Harpoon Simulation/ Stimulation in FY2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.658 | 2.661 | 3.120 | 0.000 | 3.120 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5661: *Submarine Training Device Mods* | 72.756 | 56.834 | 75.057 | - | 75.057 | 68.858 | 78.270 | 79.794 | 81.394 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The SMMTT program software development is accounted for in this RDTEN line. All production kits are procured in OPN PE 0804731N BLI 566100.

**E. Performance Metrics**

Within 90 days of introduction to the Fleet, this RDTEN project shall develop required changes to the Control and Display Documentation and Interface Description Language (IDL) Interfaces for the initial development for new sensors that are required to simulate/stimulate the TI/APB for the AN/BQQ-10 and AN/BYG-1 in the SMMTT Trainer.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

**Product Development ($ in Millions)**

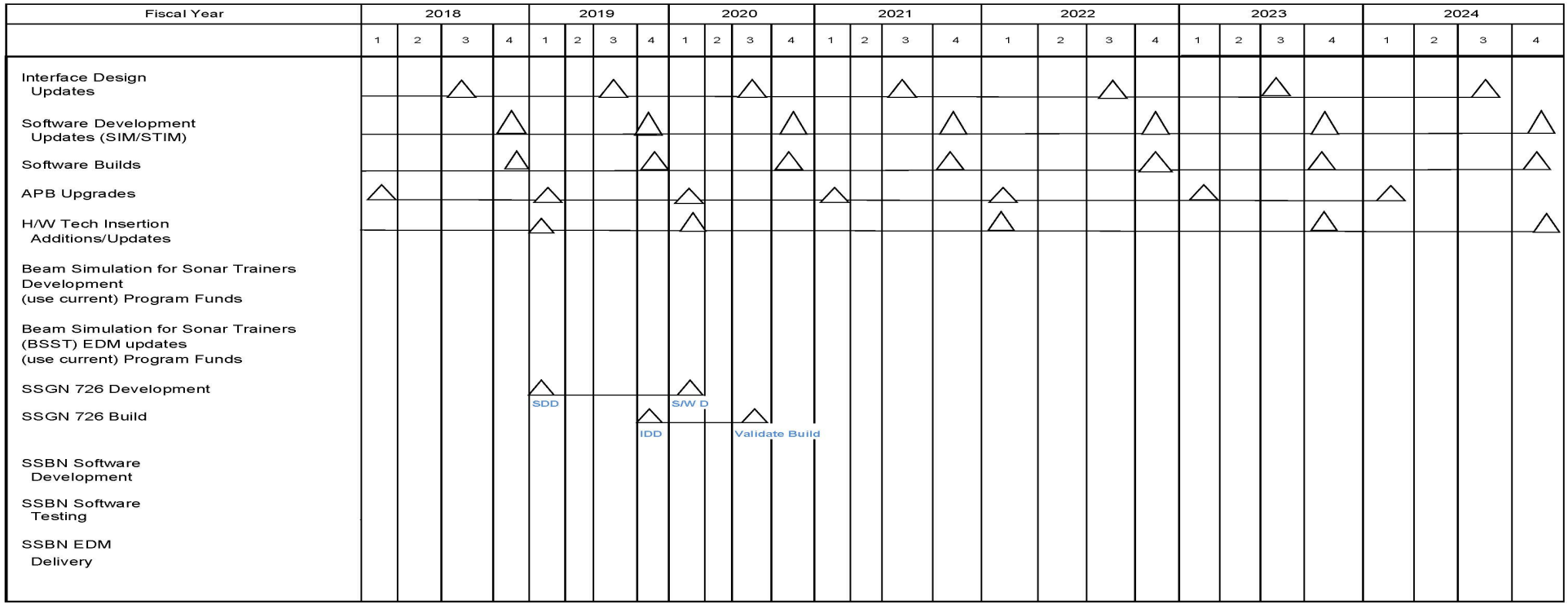
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component Development | Reqn | NSWC/CD : Bethesda, MD | 30.950 | 1.213 | Jan 2018 | 1.300 | Jan 2019 | 1.438 | Dec 2019 | - | | 1.438 | Continuing | Continuing | Continuing |
| Component Development | C/CPFF | ARL : UT Austin | 2.995 | 0.298 | Feb 2018 | 0.300 | Feb 2019 | 0.336 | Jan 2020 | - | | 0.336 | Continuing | Continuing | Continuing |
| Component Development | Reqn | NUWC/NPT : Newport, RI | 8.297 | 1.147 | Jan 2018 | 1.061 | Jan 2019 | 1.346 | Jan 2020 | - | | 1.346 | 0.000 | 11.851 | - |
| | | **Subtotal** | 42.242 | 2.658 | | 2.661 | | 3.120 | | - | | 3.120 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 42.242 | 2.658 | | 2.661 | | 3.120 | | - | | 3.120 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

PB20_RDTEN_0604558N_31JAN2019 3062 R4 NATIVE SUBMIT.JPG R4 3062-SMMTT (21) Native



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>3062 / *Submarine Multi-Mission Team Trainer* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3062*** | | | | |
| Interface design updates: Interface Design Updates | 3 | 2018 | 3 | 2024 |
| Software Development Updates: Software Development Updates (SIM/STIM) | 4 | 2018 | 4 | 2024 |
| Software Builds: Software Builds | 4 | 2018 | 4 | 2024 |
| Advanced Processing Build(APB) Upgrades: Advanced Processing Build (APB) Upgrades | 1 | 2018 | 1 | 2024 |
| Hardware Tech Insertion Updates: Hardware Tech Insertion Updates | 1 | 2019 | 4 | 2024 |
| SSGN 726 Software Development: SSSGN Development | 1 | 2019 | 1 | 2020 |
| SSGN 726 Software Build: SSGN 726 Build | 4 | 2019 | 3 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 32.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 32.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The FY19 RDT&E program increase is to continue payload system integration and electronic support measure full spectrum digitization.

The FY19 RDT&E Congressional add for small business technology insertion will be applied to further development in the areas of payloads integration and delivery; anti-submarine warfare enhancements; advanced submarine control; and non-tactical software applications. Funding will be obligated via existing SBIR contracts.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** New Design SSN SBIR (Cong)<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** - Perform systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan.<br>- Perform systems engineering of advanced Anti-Submarine Warfare (ASW) / SONAR Initiatives to support future capabilities improvements for the VIRGINIA Class Submarine.<br>- Perform systems engineering of the NOSIS mobile application development suite and potential changes to Consolidated Afloat Network Enterprise System (CANES) in support of the introduction of mobile applications with the fielding of the SECRET Wireless LAN (SWLAN). | 0.000 | 20.000 |
| ***Congressional Add:*** New Design SSN<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** - Perform systems engineering of the changes needed to the Payload Control System and the Common Weapon Launcher for integration of key submarine payloads identified within the Tactical Submarine Evolution Plan.<br>- Expand the Advanced Technology Acquisition System (ATLAS) architecture to support Electronic Support Measure (ESM) Full Spectrum Digitization. | 0.000 | 12.000 |
| **Congressional Adds Subtotals** | 0.000 | 32.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *Virginia Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • OMN/0204283N: *Sub Ops & Safety* | 10.496 | 11.038 | 11.462 | - | 11.462 | 12.003 | 12.131 | 12.357 | 12.604 | Continuing | Continuing |
| • OPN/0942: *Virginia Class Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • RDTEN/0604580N: *(U)Virginia Payload Module (VPM)* | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |

**Remarks**

**D. Acquisition Strategy**

Maximizing leverage of Congressional adds to support small business and incorporate advanced technology into the program of record.

**E. Performance Metrics**

Successful design enhancements to program of record efforts related to payload integration and electronics support measure full spectrum digitalization.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604558N / *New Design SSN* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

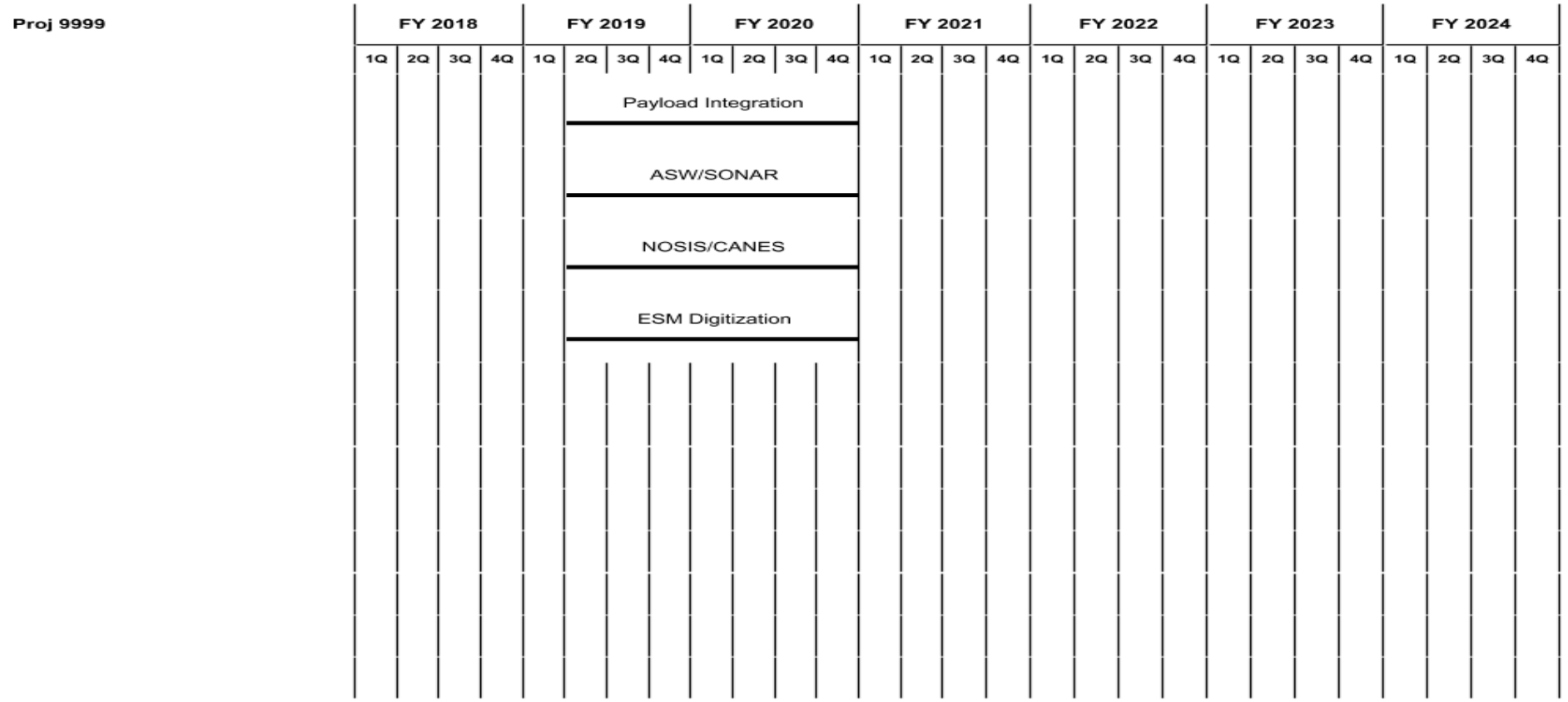
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Electronic support measure full spectrum digitalization | C/CPFF | Progeny Systems : Manassas, VA | 0.000 | 0.000 | | 12.000 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 12.000 | - |
| SBIR Increase | TBD | Various : Various | 0.000 | 0.000 | | 20.000 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 20.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 32.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 32.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604558N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604558N / *New Design SSN* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Payload Integration Systems Engineering | 2 | 2019 | 4 | 2020 |
| ASW/SONAR Systems Engineering | 2 | 2019 | 4 | 2020 |
| NOSIS/CANES Systems Engineering | 2 | 2019 | 4 | 2020 |
| ESM Full Spectrum Digitization | 2 | 2019 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604562N *I Submarine Tactical Warfare System* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 623.508 | 44.703 | 80.324 | 62.426 | - | 62.426 | 63.749 | 64.588 | 65.892 | 67.209 | Continuing | Continuing |
| 0236: *SSN Comb Cont Sys Imprvmnt (ENG)* | 623.508 | 44.703 | 60.824 | 62.426 | - | 62.426 | 63.749 | 64.588 | 65.892 | 67.209 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 19.500 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.500 |

**A. Mission Description and Budget Item Justification**

Project Unit 0236: This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades to integrate improved tactical and weapons control capabilities for multiple submarine Classes (SSN-688, SSGN, SEAWOLF, SSBN and VIRGINIA (Post Shakedown Availability)). The AN/BYG-1 is the combat control system common across submarine platforms which incorporates tactical control, payload control, and tactical Local Area Network (LAN) functions into a single development program. AN/BYG-1 allows the submarine to rapidly update the ship safety tactical picture, integrate the common tactical picture into the battlegroup, improve torpedo interfaces, and provide Tactical TOMAHAWK (TOMAHAWK Block IV) capability. The hardware upgrades, Technology Insertions (TI) are developed on a biennial basis to provide improved capability and address COTS obsolescence. Funding also accommodates the biennial integration of software Advanced Processing Builds (APB) for both tactical control (APB(T)) and payload control (APB(P)) subsystems. The tactical control integration effort incorporates the integration of other sensor (ESM, sonar, radar, etc.) inputs to provide a common operational picture and improved situational awareness in an information assurance (IA) compliant environment.

The Weapons Control development effort is winding down with pending completion of TI-16 APB15. The Payload Control System (PCS) upgrade provides a modernized PCS open architecture to support future payloads and integrate a common unmanned system controller and unmanned payloads. 21" Experimental Fuel Cell/ Unmanned Aerial System (XFC/UAS), 3" Submarine Launched Unmanned Aerial System (SLUAS) integration and transition to production.

Provides funding for the development of Payloads Launch System, Multi-tube Weapons System (MTWS), Information Assurance system, Onboard Team Trainer (OBTT), and Command, Control, Computer and Intelligence Maintenance Tool (C3IMT). FY18 added development of a Common Infrastructure Services (CIS) subsystem. This involves integration of Onboard Team Trainer - Master Controller (OBTT - MC) & Command, Control, Computer and Intelligence Maintenance Tool/ Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within Submarine Warfare Federated Tactical System (SWFTS). CIS will be an independent subsystem with its own software development and testing efforts, requiring additional funding to complete product delivery to platforms.

FY19 continues integration of Tactical Data Link (TDL) capabilities for Command & Control situational awareness, and additional R&D effort for payload integration to support MK48, APB 5+, APB 6 effort.

FY19 provides funding to commence development of APB 19 which will add two new software baselines in support of VA BLK IV Virginia Pay Module (VPM) and the COLUMBIA class (CLB). Cyber security efforts continue to grow due to increasing interconnection complexity, more IP based traffic in future baselines, and development of Cyber Safe Controls. Common Infrastructure Services development efforts begin under a new contract for APB19 and continue on APB17 under the

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604562N *I Submarine Tactical Warfare System* |

current Tactical Control System contract. As additional software applications are migrated to CIS, additional funding of this effort is required. Additional funding for early integration efforts for submarine payloads including Contender, Maritime Strike Tomahawk (MST), Next Generation Countermeasure, Anti-Torpedo Torpedo Compact Rapid Attack Weapons program (ATT CRAW) is also included in the FY 19 funding.

FY20 continues FY19 efforts on APB19 and commences TI-20 efforts. Additional funding in FY20 supports growing efforts in Information Assurance and CIS. APB effort grows to support two additional software baselines (VPM, CLB).

FY20 funding integrates Submarine Launched Harpoon BLK 1C into Payload Control System. Funds transfer from PMA 201 to NAVSEA. Submarine Launched Harpoon Platform Integration cost can't be executed by PMA 201 and will be performed by NAVSEA.

Platform integration and training costs cannot be executed by PMA201 and will be performed by NAVSEA.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 50.850 | 60.824 | 63.853 | - | 63.853 |
| Current President's Budget | 44.703 | 80.324 | 62.426 | - | 62.426 |
| Total Adjustments | -6.147 | 19.500 | -1.427 | - | -1.427 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 19.500 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.600 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -1.200 | - | -1.200 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.227 | - | -0.227 |
| • Congressional Directed Reductions Adjustments | -4.547 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Submarine Launched Unmanned Aerial System* | 0.000 | 4.500 |
| Congressional Add: *SBIR Technology Insertion* | 0.000 | 10.000 |
| Congressional Add: *Submarine Tactical Warfare System* | 0.000 | 5.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 19.500 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604562N *I Submarine Tactical Warfare System* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| Congressional Add Totals for all Projects | 0.000 | 19.500 |

**Change Summary Explanation**

The overall FY20 funding was reduced by $1.427M due to the following adjustments: -$1.5M to realign cost savings from the Submarine Tactical Warfare Systems RDTEN Common Information Services contract, +$0.5M to integrate Submarine Launched Harpoon into the Payload Control System, and -$0.227M for miscellaneous rate adjustments.

FY20 continues FY19 efforts on APB19 and commences TI-20 efforts. Additional funding in FY20 supports growing efforts in Information Assurance, CIS, and Submarine Launched Harpoon integration efforts. APB effort grows to support two additional software baselines (VPM, CLB).

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0236: *SSN Comb Cont Sys Imprvmnt (ENG)* | 623.508 | 44.703 | 60.824 | 62.426 | - | 62.426 | 63.749 | 64.588 | 65.892 | 67.209 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Project Unit 0236: This program develops Commercial-Off-The-Shelf (COTS) based software and hardware upgrades to integrate improved tactical and weapons control capabilities for multiple submarine Classes (SSN-688, SSGN, SEAWOLF, SSBN and VIRGINIA (Post Shakedown Availability)). The AN/BYG-1 is the combat control system common across submarine platforms which incorporates tactical control, payload control, and tactical Local Area Network (LAN) functions into a single development program. AN/BYG-1 allows the submarine to rapidly update the ship safety tactical picture, integrate the common tactical picture into the battlegroup, improve torpedo interfaces, and provide Tactical TOMAHAWK (TOMAHAWK Block IV) capability. The hardware upgrades, Technology Insertions (TI) are developed on a biennial basis to provide improved capability and address COTS obsolescence. Funding also accommodates the biennial integration of software Advanced Processing Builds (APB) for both tactical control (APB(T)) and payload control (APB(P)) subsystems. The tactical control integration effort incorporates the integration of other sensor (ESM, sonar, radar, etc.) inputs to provide a common operational picture and improved situational awareness in an information assurance (IA) compliant environment.

The Weapons Control development effort is winding down with pending completion of TI-16 APB15. The Payload Control System (PCS) upgrade provides a modernized PCS open architecture to support future payloads and integrate a common unmanned system controller and unmanned payloads. 21" Experimental Fuel Cell/ Unmanned Aerial System (XFC/UAS), 3" Submarine Launched Unmanned Aerial System (SLUAS) integration and transition to production.

Provides funding for the development of Payloads Launch System, Multi-tube Weapons System (MTWS), Information Assurance system, Onboard Team Trainer (OBTT), and Command, Control, Computer and Intelligence Maintenance Tool (C3IMT). FY18 added development of a Common Infrastructure Services (CIS) subsystem. This involves integration of Onboard Team Trainer - Master Controller (OBTT - MC) & Command, Control, Computer and Intelligence Maintenance Tool/ Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within Submarine Warfare Federated Tactical System (SWFTS). CIS will be an independent subsystem with its own software development and testing efforts, requiring additional funding to complete product delivery to platforms.

FY19 continues integration of Tactical Data Link (TDL) capabilities for Command & Control situational awareness, and additional R&D effort for payload integration to support MK48, APB 5+, APB 6 effort.

FY19 provides funding to commence development of APB 19 which will add two new software baselines in support of VA BLK IV Virginia Pay Module (VPM) and the COLUMBIA class (CLB). Cyber security efforts continue to grow due to increasing interconnection complexity, more IP based traffic in future baselines, and development of Cyber Safe Controls. Common Infrastructure Services development efforts begin under a new contract for APB19 and continue on APB17 under the current Tactical Control System contract. As additional software applications are migrated to CIS, additional funding of this effort is required. Additional funding for early

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

integration efforts for submarine payloads including Contender, Maritime Strike Tomahawk (MST), Next Generation Countermeasure, Anti-Torpedo Torpedo Compact Rapid Attack Weapons program (ATT CRAW) is also included in the FY 19 funding.

FY20 continues FY19 efforts on APB19 and commences TI-20 efforts. Additional funding in FY20 supports growing efforts in Information Assurance and CIS. APB effort grows to support two additional software baselines (VPM, CLB).

FY20 funding provides for Submarine launched Harpoon. Platform integration and training costs cannot be executed by PMA201 and will be performed by NAVSEA.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Processing Builds | 16.196 | 20.282 | 23.590 | 0.000 | 23.590 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Begin development of APB 17 into AN/BYG-1 (TI-18) baseline. Continue development of APB-19 into AN/BYG-1 (TI-18)baseline. Adds 2 new software baselines in APB19 (VPM & Columbia Class). | | | | | |
| ***FY 2020 Base Plans:***<br>Continue development of APB 19 into AN/BYG-1 (TI-18)baseline. Continue development of VPM & Columbia Class software baselines in APB19. Commence development of APB21 efforts. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase is due to ramping up of VPM & Columbia Class software baseline developmental efforts. | | | | | |
| ***Title:*** AN/BYG-1 TI-18 | 8.178 | 7.707 | 4.749 | 0.000 | 4.749 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue development, integration and test of the next generation AN/BYG-1 (TI-18) for SSN 688/SSGN/SSBN Class submarines. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete development, integration and test of the next generation AN/BYG-1 (TI-18) for SSN 688/SSGN/SSBN Class submarines | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease is due to the ramping down of development, integration and test of the next generation AN/BYG-1 (TI-18) for SSN 688/SSGN/SSBN Class submarines. Efforts set to complete in FY20. | | | | | |
| ***Title:*** AN/BYG-1 TI-16 | 3.996 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** AN/BYG-1 TI-20 | 0.000 | 5.737 | 8.379 | 0.000 | 8.379 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Begin development, integration and test of the next generation AN/BYG-1 (TI-20) for SSN VA Class and COLUMBIA SSBN submarines to include Common Weapons Launcher (CWL) modernization development.<br>***FY 2020 Base Plans:***<br>Continue development, integration and test of the next generation AN/BYG-1 (TI-20) for SSN VA Class and COLUMBIA SSBN submarines to include Common Weapons Launcher modernization development.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase is due to ramp up of development, integration and test of the next generation AN/BYG-1 (TI-20) for SSN VA Class and COLUMBIA SSBN submarines to include Common Weapons Launcher modernization development. This is the 2nd year of funding this TI. | | | | | |
| ***Title:*** Payload Integration | 1.777 | 5.947 | 6.532 | 0.000 | 6.532 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue software development efforts to support Mk 48 and APB5+ efforts. Additional funding for early integration efforts for submarine payloads including MK 48 APB6, Contender, Maritime Strike Tomahawk, Next Generation Countermeasure, and Anti-Torpedo Torpedo Compact Rapid Attack Weapons program.<br>***FY 2020 Base Plans:***<br>Continue software development efforts to support submarine payload integration of Mk 48, APB5+, APB6, Contender, Maritime Strike Tomahawk, Next Generation Countermeasure, and Anti-Torpedo Torpedo Compact Rapid Attack Weapons program.<br><br>Begin integration of Harpoon BLK 1C into Payload Control System.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase is due to funds transfer from PMA 201 to NAVSEA for Submarine Launched Harpoon Platform Integration efforts. | | | | | |
| ***Title:*** Payload Control System Upgrade | 5.031 | 4.224 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete development to modernize the Payload Control System software code and architecture. Contains additional efforts to integrate a common UxV interface that will be delivered with APB 19.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to completion of Payload Control System software and architecture modernization. PCS efforts in support of APB software development captured in APB subproject. | | | | | |
| ***Title:*** Testing | 3.113 | 3.176 | 3.165 | 0.000 | 3.165 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Complete DT/OT for AN/BYG-1 APB 17 on SSN 688/SEAWOLF/SSBN/SSGN/VA Class submarines.<br>***FY 2020 Base Plans:***<br>Begin DT/OT for AN/BYG-1 APB 19 on SSN 688/SEAWOLF/SSBN/SSGN/VA Class submarines.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>$11K difference from previous fiscal year. | | | | | |
| ***Title:*** Information Assurance (IA) | 3.590 | 7.474 | 8.117 | 0.000 | 8.117 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete development integration of IA Toolkit and continue IA Certification Testing on BYG-1 TI-18. Develop IA Toolkit and commence IA certification Testing on BYG-1 TI-20. Continue RMF accreditations for various systems.<br>Cyber security efforts continue to grow due increasing interconnection complexity, more IP based traffic in future baselines, and implementation of Cyber Safe Controls.<br>***FY 2020 Base Plans:***<br>Continue development of IA Toolkit and IA certification Testing on BYG-1 TI-20. Continue RMF accreditations for various systems.<br>Cyber security efforts continue to grow due increasing interconnection complexity, more IP based traffic in future baselines, and implementation of Cyber Safe Controls.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase due to increasing interconnection complexity, more IP based traffic in future baselines, and implementation of Cyber Safe Controls. | | | | | |
| ***Title:*** Unmanned Aerial System (UAS) | 1.122 | 1.147 | 2.193 | 0.000 | 2.193 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue Unmanned Aerial System development and integration efforts for 3 and 21 inch Submarine launched UAS.<br>***FY 2020 Base Plans:***<br>Continue Unmanned Aerial System development and integration efforts for 3 and 21 inch Submarine launched UAS.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Ramping up of Unmanned Aerial System (UAS) development and integration efforts for 3 and 21 inch Submarine launched UAS (SLUAS)to transition to full-rate production. | | | | | |
| ***Title:*** Common Infrastructure Services (CIS) | 1.700 | 5.130 | 5.701 | 0.000 | 5.701 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue funding for Common Infrastructure Services integrates Onboard Team Trainer - Master Controller (OBTT - MC) & Command, Control, Computer and Intelligence Maintenance Tool/Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within SWFTS. CIS will be an independent subsystem with its own software development and testing efforts, requiring additional funding to complete product delivery to platforms. Common Information Subsystem development efforts begin under a new contract for APB 19 and continue on APB 17 under the current Tactical Control System contract. As additional software applications are migrated to CIS additional funding of this effort is required.<br>***FY 2020 Base Plans:***<br>Continue funding for Common Infrastructure Services integrates Onboard Team Trainer - Master Controller & Command, Control, Computer and Intelligence Maintenance Tool/Inter-Subsystem Monitoring Tool (ISMT) efforts as well as other common services within SWFTS. CIS will be an independent subsystem with its own software development and testing efforts, requiring additional funding to complete product delivery to platforms. Common Information Subsystem (CIS) development efforts begin under a new contract for APB 19 and continue | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| on APB 17 under the current Tactical Control System contract. As additional software applications are migrated to CIS additional funding of this effort is required.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Slight ramp up in funding due to increase in common services within SWFTS. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 44.703 | 60.824 | 62.426 | 0.000 | 62.426 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5420: *SSN Combat Control Systems* | 146.972 | 125.903 | 148.547 | - | 148.547 | 176.115 | 164.701 | 163.637 | 159.567 | Continuing | Continuing |

**Remarks**

OPN BA4 Ordinance Support & Equipment. BLI 5420 SSN Combat Control Systems

**D. Acquisition Strategy**

This budget integrates APBs developed by the advanced development community.
This program has been tailored in accordance with the new DoD5000 directive to incorporate annual MDA production reviews.
Advanced Processing Builds (APB) products associated with AN/BYG-1 Release-To-Fleet 3Q 2017, 3Q 2019 and 3Q 2021.

**E. Performance Metrics**

AN/BYG-1 Submarine Combat and Payload Control System performance metrics for each Advanced Processor Build (APB) and Technology Insertion (TI) cycle are contained in the classified Capability Production Document (CPD) annex to the overarching system requirements as laid out in the Capabilities Development Document (CDD). Each APB cycle receives an updated CPD based on fleet required capabilities.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AN/BYG-1 TECH INSERTION | C/CPIF | GENERAL DYNAMICS (GDAIS) : FAIR LAKES, VA | 100.481 | 4.628 | Oct 2017 | 9.623 | Oct 2018 | 9.628 | Oct 2019 | - | | 9.628 | Continuing | Continuing | Continuing |
| AN/BYG-1 TECH INSERTION | C/CPIF | GENERAL DYNAMICS (GDAIS) : PITTSFIELD, MA | 41.994 | 0.200 | Oct 2017 | 0.000 | Oct 2018 | 0.000 | Oct 2019 | - | | 0.000 | Continuing | Continuing | Continuing |
| AN/BYG-1 TECH INSERTION | C/CPIF | PROGENY (PCS) : MANASSAS, VA | 3.643 | 4.507 | Oct 2017 | 9.594 | Oct 2018 | 9.599 | Oct 2019 | - | | 9.599 | Continuing | Continuing | Continuing |
| GOVERNMENT ENGINEERING | WR | NUWC : NEWPORT, RI | 84.978 | 1.812 | Oct 2017 | 3.848 | Oct 2018 | 3.853 | Oct 2019 | - | | 3.853 | Continuing | Continuing | Continuing |
| INFORMATION ASSURANCE | C/CPAF | PROGENY : MANASSAS, VA | 39.337 | 3.590 | Oct 2017 | 7.474 | Oct 2018 | 7.479 | Oct 2019 | - | | 7.479 | Continuing | Continuing | Continuing |
| UNMANNED AERIAL SYSTEM | C/CPIF | GENERAL DYNAMICS : FAIR LAKES, VA | 1.087 | 0.214 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| UNMANNED AERIAL SYSTEM | WR | NUWC : NEWPORT, RI | 1.061 | 0.445 | Oct 2017 | 0.675 | Oct 2018 | 1.699 | Oct 2019 | - | | 1.699 | Continuing | Continuing | Continuing |
| UNMANNED AERIAL SYSEM | C/CPIF | PROGENY (PCS) : MANASSAS, VA | 0.424 | 0.463 | Oct 2017 | 0.472 | Oct 2018 | 0.481 | Oct 2019 | - | | 0.481 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 273.005 | 15.859 | | 31.686 | | 32.739 | | - | | 32.739 | Continuing | Continuing | N/A |

**Remarks**

UAS increases above inflation in FY19 & FY20 to support transition of 3" SLUAS to full-rate production

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APB SOFTWARE INTEGRATION | C/CPIF | GENERAL DYNAMICS | 88.713 | 7.446 | Oct 2017 | 7.594 | Oct 2018 | 7.606 | Oct 2019 | - | | 7.606 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (GDAIS) : FAIRLAKES, VA | | | | | | | | | | | | | |
| APB SOFTWARE INTEGRATION | C/CPIF | GENERAL DYNAMICS : PITTSFIELD, MA | 27.850 | 0.272 | Oct 2017 | 0.000 | | 0.000 | Oct 2019 | - | | 0.000 | Continuing | Continuing | Continuing |
| APB SOFTWARE INTEGRATION | WR | NUWC : NEWPORT, RI | 58.834 | 4.765 | Oct 2017 | 4.860 | Oct 2018 | 4.862 | Oct 2019 | - | | 4.862 | Continuing | Continuing | Continuing |
| APB SOFTWARE INTEGRATION | C/CPAF | LOCKHEED MARTIN (LM-MSS) : MANASSAS, VA | 18.280 | 3.672 | Oct 2017 | 3.745 | Oct 2018 | 3.749 | Oct 2019 | - | | 3.749 | Continuing | Continuing | Continuing |
| APB SOFTWARE INTEGRATION | C/CPFF | PROGENY (PCS) : MANASSAS, VA | 5.078 | 4.705 | Oct 2017 | 4.799 | Oct 2018 | 4.803 | Oct 2019 | - | | 4.803 | Continuing | Continuing | Continuing |
| SOFTWARE DEVELOPMENT | Various | VARIOUS : VARIOUS:Not Specified | 54.158 | 2.329 | Oct 2017 | 2.375 | Oct 2018 | 2.380 | Oct 2019 | - | | 2.380 | Continuing | Continuing | Continuing |
| HARPOON PLATFORM INTEGRATION | C/CPFF | PROGENY : MANASSAS, VA | 0.000 | 0.000 | | 0.000 | | 0.500 | Oct 2019 | - | | 0.500 | 0.000 | 0.500 | - |
| | | **Subtotal** | 252.913 | 23.189 | | 23.373 | | 23.900 | | - | | 23.900 | Continuing | Continuing | N/A |

**Remarks**

PB20: HARPOON PLATFORM INTEGRATION ADD.
-Funds transfer from PMA 201 to NAVSEA for Submarine Launched Harpoon Platform Integration efforts.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEVELOPMENT TEST & EVALUATION | WR | NUWC : NEWPORT, RI | 38.062 | 0.968 | Oct 2017 | 0.987 | Oct 2018 | 0.993 | Oct 2019 | - | | 0.993 | Continuing | Continuing | Continuing |
| TEST & EVALUATION | C/CPIF | GENERAL DYNAMICS : FAIRLAKES, VA | 10.132 | 0.739 | Oct 2017 | 0.753 | Oct 2018 | 0.758 | Oct 2019 | - | | 0.758 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEST & EVALUATION | C/CPIF | GENERAL DYNAMICS : PITTSFIELD, MA | 4.236 | 0.739 | Oct 2017 | 0.753 | Oct 2018 | 0.756 | Oct 2019 | - | | 0.756 | Continuing | Continuing | Continuing |
| TEST & EVALUATION | C/CPAF | PROGENY : MANASSAS, VA | 2.313 | 0.483 | Oct 2017 | 0.492 | Oct 2018 | 0.495 | Oct 2019 | - | | 0.495 | Continuing | Continuing | Continuing |
| OPERATIONAL TEST & EVALUATION | WR | COMOPTEVFOR : NORFOLK, VA | 16.912 | 0.820 | Oct 2017 | 0.836 | Oct 2018 | 0.839 | Oct 2019 | - | | 0.839 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 71.655 | 3.749 | | 3.821 | | 3.841 | | - | | 3.841 | Continuing | Continuing | N/A |

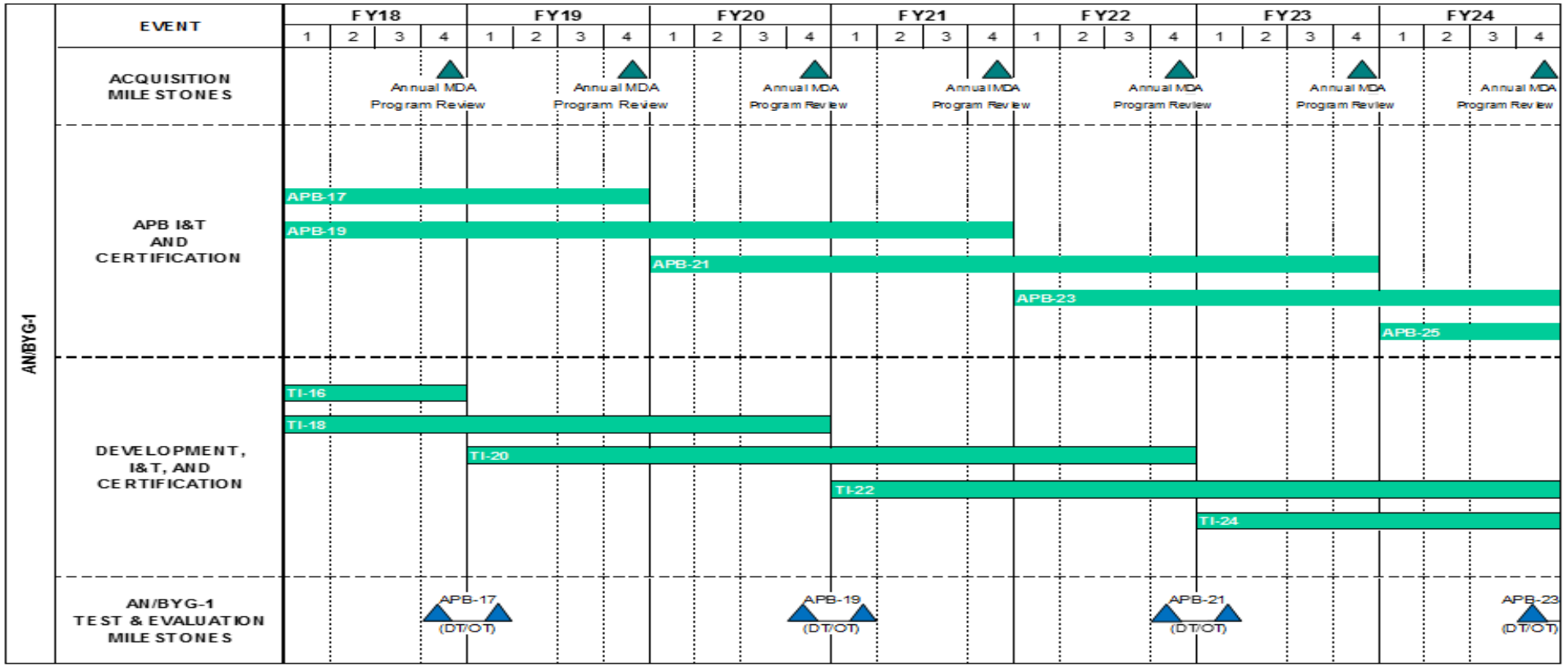
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PROGRAM MANAGEMENT SUPPORT | C/CPFF | VARIOUS : VARIOUS:Not Specified | 25.935 | 1.906 | Oct 2017 | 1.944 | Oct 2018 | 1.946 | Oct 2019 | - | | 1.946 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 25.935 | 1.906 | | 1.944 | | 1.946 | | - | | 1.946 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 623.508 | 44.703 | | 60.824 | | 62.426 | | - | | 62.426 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>0236 / *SSN Comb Cont Sys Imprvmnt (ENG)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Page 1*** | | | | |
| Acq Milestones: Annual MDA Program Review - FY18 | 4 | 2018 | 4 | 2018 |
| Acq Milestones: Annual MDA Program Review - FY19 | 4 | 2019 | 4 | 2019 |
| Acq Milestones: Annual MDA Program Review - FY20 | 4 | 2020 | 4 | 2020 |
| Acq Milestones: Annual MDA Program Review - FY21 | 4 | 2021 | 4 | 2021 |
| APB I&T, Certification: APB-17: APB-17 | 1 | 2018 | 4 | 2019 |
| APB I&T, Certification: APB-19: APB-19 | 1 | 2018 | 4 | 2021 |
| APB I&T, Certification: APB-21: APB-21 | 1 | 2020 | 4 | 2023 |
| APB I&T, Certification: APB-23: APB-23 | 1 | 2022 | 4 | 2024 |
| APB I&T, Certification: APB-25: APB-25 | 1 | 2024 | 4 | 2024 |
| Development, I&T Certification: TI-16: TI-16 | 1 | 2018 | 4 | 2018 |
| Development, I&T Certification: TI-18: TI-18 | 1 | 2018 | 4 | 2020 |
| Development, I&T Certification: TI-20: TI-20 | 1 | 2019 | 4 | 2022 |
| Development, I&T Certification: T-22: TI-22 | 1 | 2021 | 4 | 2024 |
| Development, I&T Certification: TI-24: TI-24 | 1 | 2023 | 4 | 2024 |
| Test & Evaluation Milestones: AN/BYG-1: APB-17 DT/OT | 4 | 2018 | 1 | 2019 |
| Test & Evaluation Milestones: AN/BYG-1: APB-19 DT/OT | 4 | 2020 | 1 | 2021 |
| Test & Evaluation Milestones: AN/BYG-1: APB-21 DT/OT | 4 | 2022 | 1 | 2023 |
| Test & Evaluation Milestones: AN/BYG-1: APB-23 DT/OT | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | | | | Project (Number/Name)<br>9999 / *Congressional Adds* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 19.500 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.500 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Project Unit 9999:

FY19 congressional adds provide funding to increase Submarine Launched Unmanned Aerial System ($4.5M), SBIR Technology Insertion ($10M) and Submarine Tactical Warfare System efforts ($5M).

Provides funding to continue Submarine Launched Unmanned Aerial Systems (SLUAS) development, development and employment of TI16 APB17 BYG-1 software with virtualization, containerized on expandable micro-blade servers (BYG-1 Virtual Twin) and the development and employment of all baselines of Common Weapon Launcher (CWL) software with virtualization on standard COTS hardware.

Funding provided for Submarine Warfare Federated Tactical System (SWFTS) TI18 APB19 Cybersecurity Tool Kit (CSTK) rapid deployment of increased cyber resiliency tools and automation. Funding will allow for cybersecurity improvement to be developed and fielded to SSN and SSBN platforms sooner and improve overall cyber resilience through improved tools and automation improvements.

Funding provides for improvements and increase reliability within APB17 baseline, security improvements in BYG-1 data to support recent cyber changes and future payload interfaces. Also provides funding for increased capability within OBTT into APB17 baseline to allow additional operational training functionality and increase interface capability between user and machine.

Execute BYG-1 Virtual Twin:
-Selection of BYG-1 Virtual Twin Hardware, virtualization, and containerization technology
-Full virtualization of TI16 APB17 BYG-1
-Containerization of TI16 APB17 BYG-1 subsystems into applications.
-Full test program on BYG-1 Virtual Twin using ATRT

Execute Common Weapon Launcher (CWL) Virtual Test Bed
-Full virtualization of TI16APB17 BYG-1
-Full test program on CWL Test Bed
-Final Delivery to Government.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Submarine Launched Unmanned Aerial System<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Begin development and procurement of two shipsets (24 units) of Blackwing to support Initial Operating Capability in FY20.<br><br>Begin development and procurement of five shipsets (60 units) of Hammerhead Spiral 1 Canisters to support Initial Operating Capability in FY20.<br><br>Begin development of Interface Control Document (ICD), manufacturability improvements (to lower unit costs), and design of expansion of internal space to house larger UAV.<br><br>Begin design and implementation of capability and interface requirements for submarine launch. | 0.000 | 4.500 |
| ***Congressional Add:*** SBIR Technology Insertion<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Develop a containerized/virtualized BYG-1 Baseline on expandable micro-blade servers. Begin install configuration as tempalt to perform demonstration of reduced SWAP, configurable BYG-1. Develop a containerized/virtualized BYG-1 Baseline and SPEAR test tool. Begin building Test Bay as a service, associated security and demonstrate automated, remote testing capability via WAIF.<br><br>Develop and employ all baselines of CWL software with virtualization on standard COTS hardware.<br><br>Begin development and procurement of an SWFTS APB19 Cybersecurity Tool Kit (CSTK) Improvement to support Initial Operating Capability in FY20. | 0.000 | 10.000 |
| ***Congressional Add:*** Submarine Tactical Warfare System<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Begin Phase 1 Command Applications and Platform (CAAP) implementation development and integration of Augmented Intelligence (AI) into BYG-1 to enhance ability to recognize and respond to changes in risk factors such as collision and counter detection. | 0.000 | 5.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| Begin and complete ISMT development and integration into APB-17 baseline. Begin ISMT development and integration of ISMT into APB-19 baseline. | | |
| **Congressional Adds Subtotals** | 0.000 | 19.500 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Once developed, these modernization upgrades will be part of the TI/APB software baselines, utilizing the same Acquisition Strategy as the Tactical Warfare System.
The program budget integrates APBs developed by the advanced development community.
This program has been tailored in accordance with the new DoD5000 directive to incorporate annual MDA production reviews.
Advanced Processing Builds (APB) products associated with AN/BYG-1 Release-To-Fleet 3Q 2017, 3Q 2019 and 3Q 2021.

Near term: Continued refinement of the AWESUM AUR with improvements in reliability, maturity of design, IA compliance and compatibility with the Common Communications solution being developed with PMS 425 and SEA 073.
Far term: Within Five years, leveraging the discovery from near term efforts and achieving actual feedback from fleet operations, the Program expects to submit a RFP to best produce the next generation of AUR development and system employment.
SLUAS Controller modernization upgrades will be incorporated into the TI/APB software baselines, utilizing the same Acquisition Strategy as the Tactical Warfare System for BYG-1.
This program has been tailored in accordance with the new DoD 5000 directive to incorporate annual MDA production reviews.

**E. Performance Metrics**

AN/BYG-1 Submarine Combat and Payload Control System performance metrics for each Advanced Processor Build (APB) and Technology Insertion (TI) cycle are contained in the classified Capability Production Document (CPD) annex to the overarching system requirements as laid out in the Capabilities Development Document (CDD). Each APB cycle receives an updated CPD based on Fleet required capabilities.

In transition from the JCTD, initial Key Performance Parameters and Key Attributes are contained in the Functional Requirements Document, as established by COMPSUBPAC and modified by OPNAV N97.
In establishing the Program of Record, a Performance Specification and a Capability Production Document (CPD) are being developed.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

AN/BYG-1 Submarine Combat and Payload Control System performance metrics for each Advanced Processor Build (APB) and Technology Insertion (TI) cycle are contained in the classified CPD annex to the overarching system requirements as laid out in the Capabilities Development Document (CDD). Each APB cycle receives an updated CPD based on Fleet required capabilities.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYG-1 Virtual Twin | Various | Various : Various | 0.000 | 0.000 | | 1.250 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.250 | - |
| CWL Virtual Test Bed | TBD | Progeny : Manassas, Va | 0.000 | 0.000 | | 0.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| SPEAR & Continuous Integration | Various | Various : Various | 0.000 | 0.000 | | 0.800 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.800 | - |
| Blackwing Shipset | C/CPFF | AeroVironment : Simi Valley, CA | 0.000 | 0.000 | | 1.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.500 | - |
| Hammerhead Shipset | C/CPFF | Sparton : DeLeon Springs, FL | 0.000 | 0.000 | | 1.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.000 | - |
| Hammerhead Cannister Improvements | C/CPFF | Sparton : DeLeon Springs, FL | 0.000 | 0.000 | | 0.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| TBD - DIU Award | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.900 | May 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.900 | - |
| Integrated Systems Monitoring Tool (ISMT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.110 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.110 | - |
| On-Board Team Trainer (OBTT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.200 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| Phase 1 CAAP Implementation | C/CPFF | Assett : Manassas, Va | 0.000 | 0.000 | | 1.300 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.300 | - |
| SWFTS APB19 Cybersecurity Tool Kit | C/CPFF | Progeny : Manassas, Va | 0.000 | 0.000 | | 3.000 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 11.060 | | 0.000 | | - | | 0.000 | 0.000 | 11.060 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYG-1 Virtual Twin | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 0.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| CWL Test Bed | TBD | Progeny : Manassas, VA | 0.000 | 0.000 | | 0.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPEAR & Continuous Integration | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 0.100 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Integrated Systems Monitoring Tool (ISMT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.374 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.374 | - |
| Security Classification Guide | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.090 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.090 | - |
| Phase 1 CAAP Implementation | C/CPFF | Assett : Manassas, VA | 0.000 | 0.000 | | 1.350 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.350 | - |
| SWFTS APB19 Cybersecurity Tool Kit | C/CPFF | Progeny : Manassas, VA | 0.000 | 0.000 | | 0.500 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 2.914 | | 0.000 | | - | | 0.000 | 0.000 | 2.914 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYG-1 Virtual Twin | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 1.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.000 | - |
| CWL Test Bed | TBD | Progeny : Manassas, VA | 0.000 | 0.000 | | 0.400 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| SPEAR & Continuous Integration | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 0.250 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| TBD - DIU Award | C/CPFF | Not Specified : Not Specified | 0.000 | 0.000 | | 0.100 | May 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Integrated Systems Monitoring Tool (ISMT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.143 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.143 | - |
| On-Board Team Trainer (OBTT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.205 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.205 | - |
| Phase 1 CAAP Implementation | C/CPFF | Assett : Manassas, VA | 0.000 | 0.000 | | 0.850 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.850 | - |
| SWFTS APB19 Cybersecurity Tool Kit | C/BA | Progeny : Manassas, VA | 0.000 | 0.000 | | 0.750 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 0.000 | 0.000 | | 3.698 | | 0.000 | | - | | 0.000 | 0.000 | 3.698 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BYG-1 Virtual Twin | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 0.250 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| CWL Test Bed | TBD | Progeny : Manassas, VA | 0.000 | 0.000 | | 0.100 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| SPEAR & Continuous Integration | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 0.100 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Blackwing Shipset | C/CPFF | AeroVironment : Simi Valley, CA | 0.000 | 0.000 | | 0.500 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| Hammerhead Shipset | C/CPFF | Sparton : DeLeon Springs, FL | 0.000 | 0.000 | | 0.250 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| Integrated Systems Monitoring Tool (ISMT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.100 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Security Classification Guide | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.020 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.020 | - |
| On-Board Team Trainer (OBTT) | C/CPFF | Rite Solutions : Middletown, RI | 0.000 | 0.000 | | 0.050 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Phase 1 CAAP Implementation | C/CPFF | Assett : Manassas, VA | 0.000 | 0.000 | | 0.200 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| SWFTS APB19 Cybersecurity Tool Kit | C/CPFF | Progeny : Manassas, VA | 0.000 | 0.000 | | 0.258 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.258 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 1.828 | | 0.000 | | - | | 0.000 | 0.000 | 1.828 | N/A |

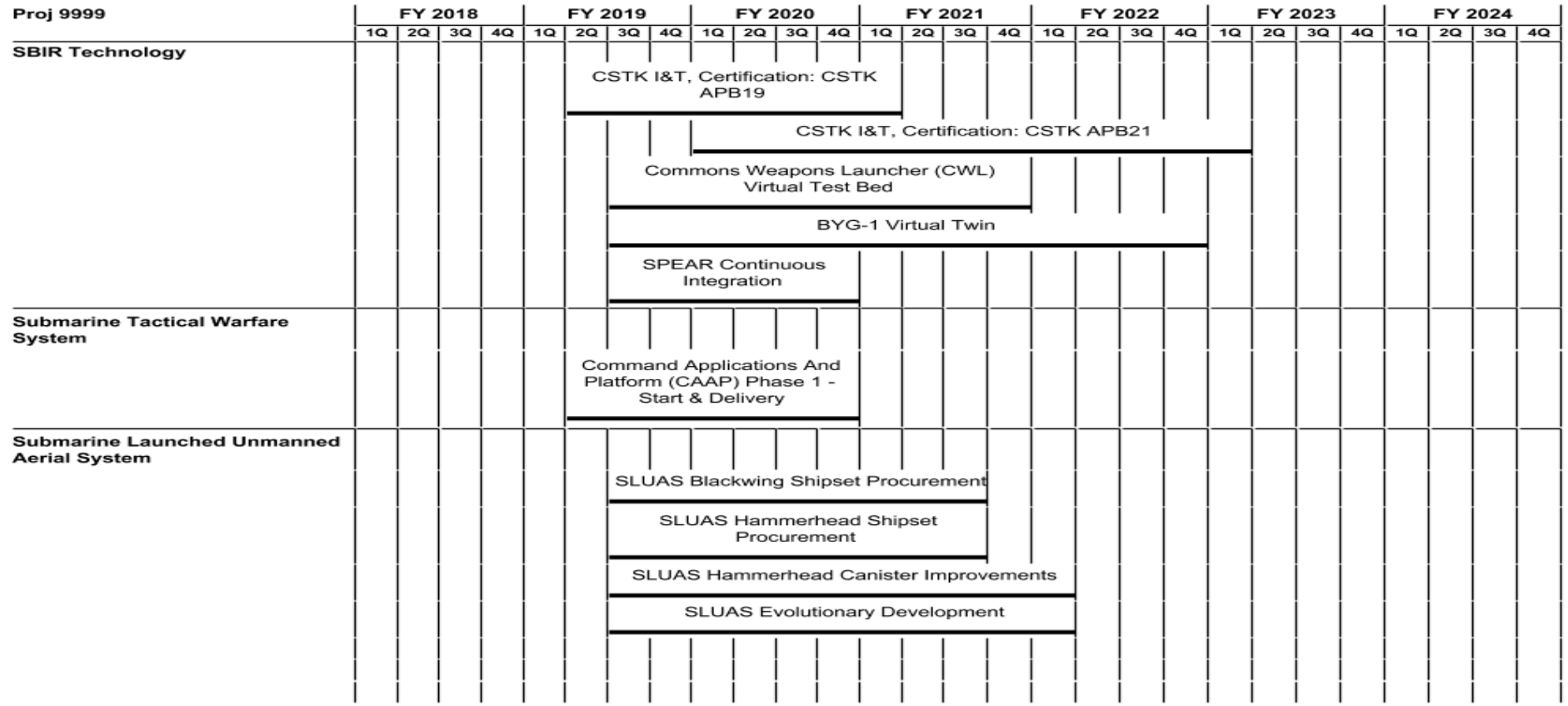
| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 19.500 | | 0.000 | | - | | 0.000 | 0.000 | 19.500 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604562N / *Submarine Tactical Warfare System* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604562N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604562N / *Submarine Tactical Warfare System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| SBIR Technology: CSTK I&T, Certification: CSTK APB19 | 2 | 2019 | 1 | 2021 |
| SBIR Technology: CSTK I&T, Certification: CSTK APB21 | 1 | 2020 | 1 | 2023 |
| SBIR Technology: Commons Weapons Launcher (CWL) Virtual Test Bed | 3 | 2019 | 4 | 2021 |
| SBIR Technology: BYG-1 Virtual Twin | 3 | 2019 | 4 | 2022 |
| SBIR Technology: IDT SPEAR Continuous Integration | 3 | 2019 | 4 | 2020 |
| Submarine Tactical Warfare System: Command Applications And Platform (CAAP) Phase 1 - Start & Delivery | 2 | 2019 | 4 | 2020 |
| Submarine Launched Unmanned Aerial System: SLUAS Blackwing Shipset Procurement | 3 | 2019 | 3 | 2021 |
| Submarine Launched Unmanned Aerial System: SLUAS Hammerhead Shipset Procurement | 3 | 2019 | 3 | 2021 |
| Submarine Launched Unmanned Aerial System: SLUAS Hammerhead Canister Improvements | 3 | 2019 | 1 | 2022 |
| Submarine Launched Unmanned Aerial System: SLUAS Defense Innovation (DIU) Evolutionary Development | 3 | 2019 | 1 | 2022 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604567N *I Ship Contract Design/ Live Fire T&E* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 728.968 | 65.857 | 71.062 | 46.809 | - | 46.809 | 61.547 | 55.036 | 55.612 | 56.726 | Continuing | Continuing |
| 1803: *Ship Contract Design* | 135.011 | 3.811 | 3.111 | 1.939 | - | 1.939 | 4.033 | 3.850 | 3.411 | 3.477 | Continuing | Continuing |
| 2465: *LHA(R) FLT Design and Total Ship Integration* | 259.734 | 8.135 | 6.841 | 2.311 | - | 2.311 | 13.462 | 6.060 | 6.177 | 6.300 | Continuing | Continuing |
| 3108: *CVN 80 Total Ship Integration* | 30.231 | 32.161 | 31.563 | 23.941 | - | 23.941 | 25.105 | 25.703 | 26.218 | 26.745 | Continuing | Continuing |
| 3179: *CVN-79 Total Ship Integration* | 201.980 | 16.397 | 14.536 | 14.564 | - | 14.564 | 14.770 | 15.133 | 15.432 | 15.743 | Continuing | Continuing |
| 3369: *Hybrid Electric Drive* | 13.218 | 0.982 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 14.200 |
| 4007: *CVN 21 LFT&E* | 69.451 | 3.919 | 4.011 | 4.054 | - | 4.054 | 4.177 | 4.290 | 4.374 | 4.461 | Continuing | Continuing |
| 9999: *Congressional Adds* | 19.343 | 0.452 | 11.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 30.795 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 333, 223 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $1.251 million to account for the availability of prior year execution balances.

This Program Element (PE) directly supports the Navy's Shipbuilding Plan by providing for the development of engineering, programmatic and acquisition documentation including ship specifications (including performance specifications) and contractual documentation associated with acquisition of Navy ships. This PE also supports the Congressionally mandated Live Fire Test and Evaluation (LFT&E) program for new ship designs.

Contract Design has traditionally been the engineering development of the technical and contractual definition of the ship design (including ship specifications and drawings) to a level of detail sufficient for shipbuilders to make a sound estimate of the construction cost and schedule. Additionally, the contract design package developed under this PE has provided the technical baseline from which the Navy selects the shipbuilder who then develops the detail design package required to support the construction and eventual delivery of the ship. This PE also supports the development of design methodologies/tools which facilitate and optimize the transition from ship design documents to efficient production of new ships and ship conversions, and supports engineering planning and ship affordability studies.

Under Acquisition Reform for new design ships, traditional distinct phasing of the design process has been replaced with a continuous concurrent engineering Integrated Product and Process Development (IPPD) process extending through and after contract award. This serves to maintain the focus of multi-discipline teams consisting of the government,

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604567N *I Ship Contract Design/ Live Fire T&E* |

shipbuilder, system programs, and suppliers. Government/Industry Integrated Product Team(s) (IPTs) will utilize the IPPD process to develop the design in an Integrated Product and Data Environment (IPDE). The design approach is part of an acquisition strategy that is based on commercial practices and incorporates a phased technical definition.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 67.166 | 60.062 | 59.688 | - | 59.688 |
| Current President's Budget | 65.857 | 71.062 | 46.809 | - | 46.809 |
| Total Adjustments | -1.309 | 11.000 | -12.879 | - | -12.879 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 11.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.779 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -12.526 | - | -12.526 |
| • Rate/Misc Adjustments | 0.002 | 0.000 | -0.353 | - | -0.353 |
| • Congressional Add Adjustments | 0.468 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Maritime Prepositioning Force (Future) - Transfer from NDSF* | 0.452 | 0.000 |
| Congressional Add: *DDG 51 Advance Degaussing Mine Protection System Retrofit* | 0.000 | 5.000 |
| Congressional Add: *Planning to Support FY 2021 Award of LHA-9* | 0.000 | 6.000 |
| Congressional Add Subtotals for Project: 9999 | 0.452 | 11.000 |
| Congressional Add Totals for all Projects | 0.452 | 11.000 |

**Change Summary Explanation**

FY18:
PROJ 9999 CONG ADD for Maritime Prepositioning Force (Future): Transfer from NDSF (+$0.468M)

FY19:
PROJ 9999 CONG ADD for DDG 51 Advance Degaussing Mine Protection System Retrofit (+$5.000M)

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604567N *I Ship Contract Design/ Live Fire T&E* |

PROJ 9999 CONG ADD for Planning to Support FY 2021 Award of LHA-9 (+$6.000M)

FY20:
PROJ 1803 FY 2020 funding request was reduced by $1.251 million to account for the availability of prior year execution balances.
PROJ 2465 rephased $7.535M from FY 2020 to FY 2021 due to the delay of the F-35B Follow-on Operational Test and Evaluation (FOT&E) event.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>1803 / *Ship Contract Design* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1803: *Ship Contract Design* | 135.011 | 3.811 | 3.111 | 1.939 | - | 1.939 | 4.033 | 3.850 | 3.411 | 3.477 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

DDG Modernization:
The major effort is the engineering development of the technical and contractual definition of the ship's design (e.g. ship specifications and drawings), with sufficient details for the planning yard to make a sound estimate of cost and schedule. It also serves as the technical definition from which the planning yard develops the detailed design and testing package required to build and test the ship. It provides the Navy with a digital, ship design knowledge base, including lessons learned, required to ensure that a proper development, analysis and evaluation can be conducted of any current or future planned.

Another area this project funds is the development of specific Navy ship criteria and standards for newly developed technologies. Additionally, as new laws are passed, new safety regulations and environmental criteria are developed and other legal/Congressional requirements identified, this project funds the translation into Navy ship design criteria
and standards. This project also funds the translation of the traditional Ship Specifications into performance-based criteria, which supports the development of design methodologies/tools which facilitate and optimize the transition from ship design documents to ship alterations. This project also supports ship survivability studies, superstructure integrity analysis, developmental and operational testing, gun weapon system software integration and next generation Machinery Control System (MCS) software integration.

Expeditionary Sea Base (ESB) (formerly MLP AFSB)
Funds the performance specification development and Dynamic Interface Testing for various airframes as part of the ESB Special Operations Forces (SOF) Backfit.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Ship Contract Design | 2.199 | 3.111 | 1.939 | 0.000 | 1.939 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue ship design and alteration development for service life extension and HM&E network upgrades in CG 47 and for DDG 51 Flt IIA ship design to include development of structural reliability and other alterations to include machinery control systems improvements in FY 19. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>1803 / *Ship Contract Design* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue ship design and alteration development for service life extension and HM&E network upgrades in CG 47 and for DDG 51 Flt IIA ship design to include development of structural reliability and other alterations to include machinery control systems improvements in FY 20.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY 2020 funding request was reduced to account for the availability of prior year execution balances. | | | | | |
| ***Title:*** ESB | 1.612 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.811 | 3.111 | 1.939 | 0.000 | 1.939 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 0900: *DDG Mod* | 592.644 | 462.908 | 566.140 | - | 566.140 | 555.525 | 812.338 | 1,042.482 | 1,107.075 | 2,558.665 | 10,388.593 |
| • OPN 0960: *CG Mod* | 299.088 | 268.509 | 193.990 | - | 193.990 | 135.490 | 54.116 | 5.079 | 5.180 | 0.000 | 3,850.890 |

**Remarks**

**D. Acquisition Strategy**

Continuing systems and software development for both development models and production machinery control units at Land Based Engineering Sites.

**E. Performance Metrics**

CG:

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>1803 / *Ship Contract Design* |

Aluminum sensitization study to determine the lifetime until sensitization for aluminum alloys and stress and buckling analysis of the CG 47 Class ship structure, and develop proposed fatigue fixes in the high stress areas to produce a technical report with modifications or improvements to the ship that may be necessary to preclude cracking in the areas of concern. Evaluation of composite patch and development of composite patch installation procedures as a method for repairing cracks. Development of ultrasonic impact treatment guidance as a method for repairing cracks. Evaluation of different coating that can prevent cracking and different aluminum alloys that are sensitization resistant. Additionally, review and track distributed services margins, predict future system loads, develop technical reports and make recommendation to ensure reaching hull service life.

DDG Modernization:
Efforts for DDG Mod include design and development for next generation MCS software integration.

ESB: Completion of Certification Testing including Dynamic Interface Testing.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>1803 / *Ship Contract Design* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CG Mod Electronics Systems Eng | C/CPAF | Lockheed : Martin, Moorestown, NJ | 17.413 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DON Energy Initiative - OEM | C/FPIF | L-3 Maritime Systems : Leesburg, VA | 34.857 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 34.857 | - |
| DON Energy Initiative | WR | NSWC/SSES : Philadelphia, PA | 3.629 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.629 | - |
| Engineering Development and Design | Various | COTF/NAVAIR/ NSWCCD/ NSWCDD/NSWCPC/ NSWCPHD/ NSWCSSES : DC/ MD/PA/CA | 1.085 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.085 | - |
| Preliminary and Contract Design | C/FPIF | NASSCO : San Diego, CA | 6.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.500 | - |
| Hybrid Electric Drive | C/CPIF | L-3 Maritime Systems : Leesburg, VA | 6.911 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.911 | - |
| Hybrid Electric Drive | C/CPAF | Rolls Royce : Walpole, MA | 0.100 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| Hybrid Electric Drive | C/CR | General Atomics : San Diego, CA | 0.040 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.040 | - |
| Hybrid Electric Drive | C/CPAF | Herren Engineering : Alexandria, VA | 0.600 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.600 | - |
| Hybrid Electric Drive | C/CPAF | Syntek : Arlington, VA | 0.099 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.099 | - |
| Hybrid Electric Drive | WR | NSWC/SSES : Philadelphia, PA | 0.750 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |
| Hybrid Electric Drive | TBD | Not Specified : Not Specified | 8.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.500 | - |
| | | **Subtotal** | 80.484 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>1803 / *Ship Contract Design* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DDG/CGM Program / Engineering Spt | WR | NSWC/DD : Dahlgren, VA | 4.376 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DDGM Program/ Engineering Spt | Various | SUPSHIP/BATH : Bath, ME | 3.331 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DDG/CGM Program / Engineering Spt | C/CPAF | CSC/BAE : Hampton, VA | 4.713 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DDG/CGM Program / Engineering Spt | WR | SPAWARSYSCEN : Charleston, SC | 2.004 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CGM Program / Engineering Spt | WR | NRL : Washington, DC | 0.617 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CGM Program / Engineering Spt | C/CPAF | JJMA/ALION : Washington, DC | 2.947 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DDG/CGM Program / Engineering Spt | C/CPAF | Lockheed Martin : Moorestown, NJ | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| DDG/CGM Program / Engineering Spt | WR | NSWC/PHD : Port Hueneme, CA | 2.889 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | C/CPFF | CSC : Washington DC | 0.085 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.085 | - |
| CGM/DDG Program / Engineering Spt | WR | COMPTEVFOR : Norfolk, VA | 0.420 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DDGM/HED Program / Engineering Spt | WR | NSWC/SSES : Philadelphia, PA | 4.900 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DDGM Program / Engineering Spt | WR | NSWC/SSES : Philadelphia, PA | 4.682 | 0.527 | Jan 2018 | 0.746 | Jan 2019 | 0.457 | Jan 2020 | - | | 0.457 | 0.000 | 6.412 | - |
| HED Program / Engineering Spt | WR | NSWC/SSES : Philadelphia, PA | 0.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| HED | C/CPAF | L-3 Maritime Systems : Leesburg, VA | 1.048 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CG Program / Engineering Spt | WR | NSWC/BETHESDA : Bethesda, MD | 9.640 | 0.329 | Jan 2018 | 0.466 | Jan 2019 | 0.285 | Jan 2020 | - | | 0.285 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>1803 / *Ship Contract Design* | |

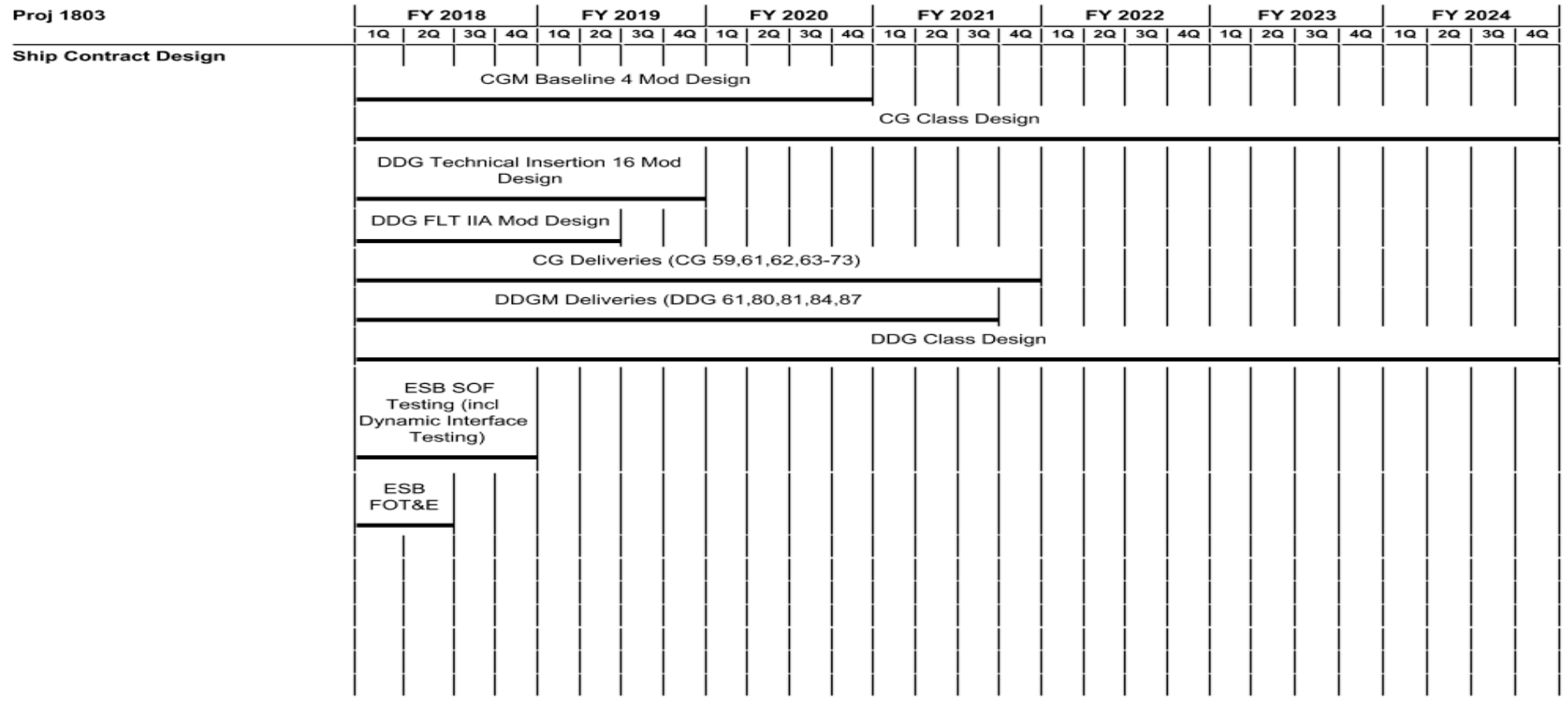
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CG Program / Engineering Spt | Various | SUPSHIP/ PASCAGOULA : Pascagoula, MS | 4.736 | 0.180 | Jun 2018 | 0.255 | Jun 2019 | 0.156 | Jun 2020 | - | | 0.156 | Continuing | Continuing | Continuing |
| CG Program / Engineering Spt | WR | NSWC/SSES : Philadelphia, PA | 0.681 | 0.840 | Jan 2018 | 1.189 | Jan 2019 | 0.762 | Jan 2020 | - | | 0.762 | 0.000 | 3.472 | - |
| DDG/CGM Program / Engineering Spt | C/CPFF | John Hopkins University : Laurel, MD | 1.300 | 0.322 | Apr 2018 | 0.455 | Apr 2019 | 0.279 | Apr 2020 | - | | 0.279 | 0.000 | 2.356 | - |
| ESB | Various | Various : Various | 3.663 | 1.613 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.276 | - |
| NAVSEA Boundary Defense Capability | Various | Various : Various | 1.995 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.995 | - |
| | | **Subtotal** | 54.527 | 3.811 | | 3.111 | | 1.939 | | - | | 1.939 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 135.011 | 3.811 | | 3.111 | | 1.939 | | - | | 1.939 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>1803 / *Ship Contract Design* |




*2020PB - 0604567N - 1803*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>1803 / *Ship Contract Design* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1803*** | | | | |
| Ship Contract Design: CGM Baseline 4 Mod Design | 1 | 2018 | 4 | 2020 |
| Ship Contract Design: CG Class Design | 1 | 2018 | 4 | 2024 |
| Ship Contract Design: DDG Technical Insertion 16 Mod Design | 1 | 2018 | 4 | 2019 |
| Ship Contract Design: DDG FLT IIA Mod Design | 1 | 2018 | 2 | 2019 |
| Ship Contract Design: CG Deliveries (CG 59,61,62,63-73) | 1 | 2018 | 4 | 2021 |
| Ship Contract Design: DDGM Deliveries (DDG 61,80,81,84,87) | 1 | 2018 | 3 | 2021 |
| Ship Contract Design: DDG Class Design | 1 | 2018 | 4 | 2024 |
| Ship Contract Design: ESB SOF Testing (incl Dynamic Interface Testing) | 1 | 2018 | 4 | 2018 |
| Ship Contract Design: ESB FOT&E | 1 | 2018 | 2 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>2465 / *LHA(R) FLT Design and Total Ship Integration* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2465: *LHA(R) FLT Design and Total Ship Integration* | 259.734 | 8.135 | 6.841 | 2.311 | - | 2.311 | 13.462 | 6.060 | 6.177 | 6.300 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 333

**A. Mission Description and Budget Item Justification**

This project provides the contract design, development and testing efforts for the Amphibious Assault Ship Replacement Program LHA(R). The LHA(R) is a ship construction program designed to: (1) provide a functional replacement for the Amphibious Assault Ships which reached the end of their extended service lives (2) be a key platform in the Amphibious Readiness Group (ARG) of the future and (3) provide for an affordable and sustainable amphibious ship development program. LHA(R) ships will provide forward presence and power projection as an integral part of Joint, inter-agency, and multi-national maritime expeditionary forces. Additionally, LHA(R) will be designed to operate for sustained periods in transit to and operations in an Amphibious Objective Area to include the embarkation, deployment, and landing of a Marine Landing Force in an assault by helicopters and tilt rotors (MV-22) supported by Joint Strike Fighters (F-35B).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** LHA (R) FLT 0 Design and Total Ship Integration - LHA 6 | 1.295 | 1.064 | 0.090 | 0.000 | 0.090 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>LHA 6 Complete LHA Class Reliability Maintainability and Availability (RMA). | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to rephasing requirements for the F-35B Follow-on Operational Test and Evaluation (FOT&E) event to FY 2021. | | | | | |
| ***Title:*** LHA (R) FLT 1 Design and Total Ship Integration - LHA 8 | 6.840 | 5.777 | 2.221 | 0.000 | 2.221 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>LHA 8 Initiate Reliability Maintainability Availability (RMA) analysis. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>2465 / *LHA(R) FLT Design and Total Ship Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| LHA 8 Continue Vulnerability Assessment Report.<br>LHA 8 Continue Enterprise Air Search Radar integration efforts.<br>LHA 8 Continue Operational Test & Evaluation preparation for Operational Assessment.<br>***FY 2020 Base Plans:***<br>LHA 8 Complete Enterprise Air Search Radar integration efforts.<br>LHA 8 Continue Reliability Maintainability Availability analysis.<br>LHA 8 Continue Vulnerability Assessment Report.<br>LHA 8 Continue Operational Test & Evaluation preparation for Operational Assessment.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease primarily associated with Enterprise Air Search Radar ramping down to final test analysis and refinement of drawings, and, reduction of test requirements. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.135 | 6.841 | 2.311 | 0.000 | 2.311 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/3041: *LHA (R) Ships* | 1,725.127 | 375.100 | 0.000 | - | 0.000 | 0.000 | 0.000 | 170.602 | 1,617.834 | 1,937.964 | 14,366.692 |

**Remarks**

**D. Acquisition Strategy**

LHA 6 Advanced Procurement and Long Lead Time Material was awarded on a sole source basis to Huntington Ingalls Inc., formerly Northrop Grumman Shipbuilding, on 15 July 2005; LHA 6 Detail Design and Construction (DD&C) was awarded on 1 June 2007. The Advance Procurement and Long Lead Time Material efforts were subsumed by the Fixed Price Incentive, Firm Target DD&C contract.

LHA 7 Advanced Procurement and Long Lead Time Material was awarded on a sole source basis to Huntington Ingalls Inc., formerly Northrop Grumman Shipbuilding, on 30 June 2010; LHA 7 DD&C was awarded on 31 May 2012. The Advanced Procurement and Long Lead Time Material efforts were subsumed by the Fixed Price Incentive, Firm Target DD&C contract.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>2465 / *LHA(R) FLT Design and Total Ship Integration* |

LHA 8 Planning, Advanced Engineering and Procurement of Long Lead Time Material (LLTM) for an LHA Replacement (LHA(R)) Flight 1 Amphibious Assault Ship was awarded on a competitive basis to Huntington Ingalls Inc. on 30 June 2016. The option for LHA 8 Detail Design and Construction was awarded on 16 June 2017. The Planning, Advanced Engineering and Procurement of Long Lead Time Material (LLTM) efforts were subsumed into this Fixed Price Incentive, Firm Target DD&C contract option.

LHA 9 Acquisition Strategy is in development.

**E. Performance Metrics**

Successfully achieve Initial Operational Capability, successfully complete Operational Test and Milestone Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>2465 / *LHA(R) FLT Design and Total Ship Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ship Design | WR | NSWC : Various | 97.905 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 97.905 | - |
| Ship Design | C/CPFF | HII : Pascagoula, MS | 5.009 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.009 | - |
| Ship Design | C/CPFF | Various : Various | 44.087 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 44.087 | - |
| Special Studies | WR | NSWC : Panama City, FL | 4.800 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.800 | - |
| | | **Subtotal** | 151.801 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 151.801 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technical Engineering Services | Various | NSWC : Various | 2.300 | 4.251 | Dec 2017 | 3.316 | Dec 2018 | 1.197 | Dec 2019 | - | | 1.197 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.300 | 4.251 | | 3.316 | | 1.197 | | - | | 1.197 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | MIPR | JITC : Fort Huachuca, AZ | 4.559 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.559 | - |
| Operational Test & Evaluation | WR | OPTEVFOR/ MCOTEA/NAVSUP : Norfolk, VA/ Quantico, VA | 21.381 | 1.045 | Dec 2017 | 1.029 | Dec 2018 | 0.481 | Dec 2019 | - | | 0.481 | Continuing | Continuing | Continuing |
| Live Fire Test & Evaluation | WR | NSWC : Various | 62.672 | 2.785 | Dec 2017 | 2.408 | Dec 2018 | 0.548 | Dec 2019 | - | | 0.548 | Continuing | Continuing | Continuing |
| Follow-on Operational Test and Evaluation | WR | OPTEVFOR / MCOTEA : Norfolk, VA / Quantico, VA | 0.000 | 0.000 | | 0.000 | Dec 2018 | 0.000 | Dec 2019 | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 88.612 | 3.830 | | 3.437 | | 1.029 | | - | | 1.029 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>2465 / *LHA(R) FLT Design and Total Ship Integration* | |

**Management Services ($ in Millions)**

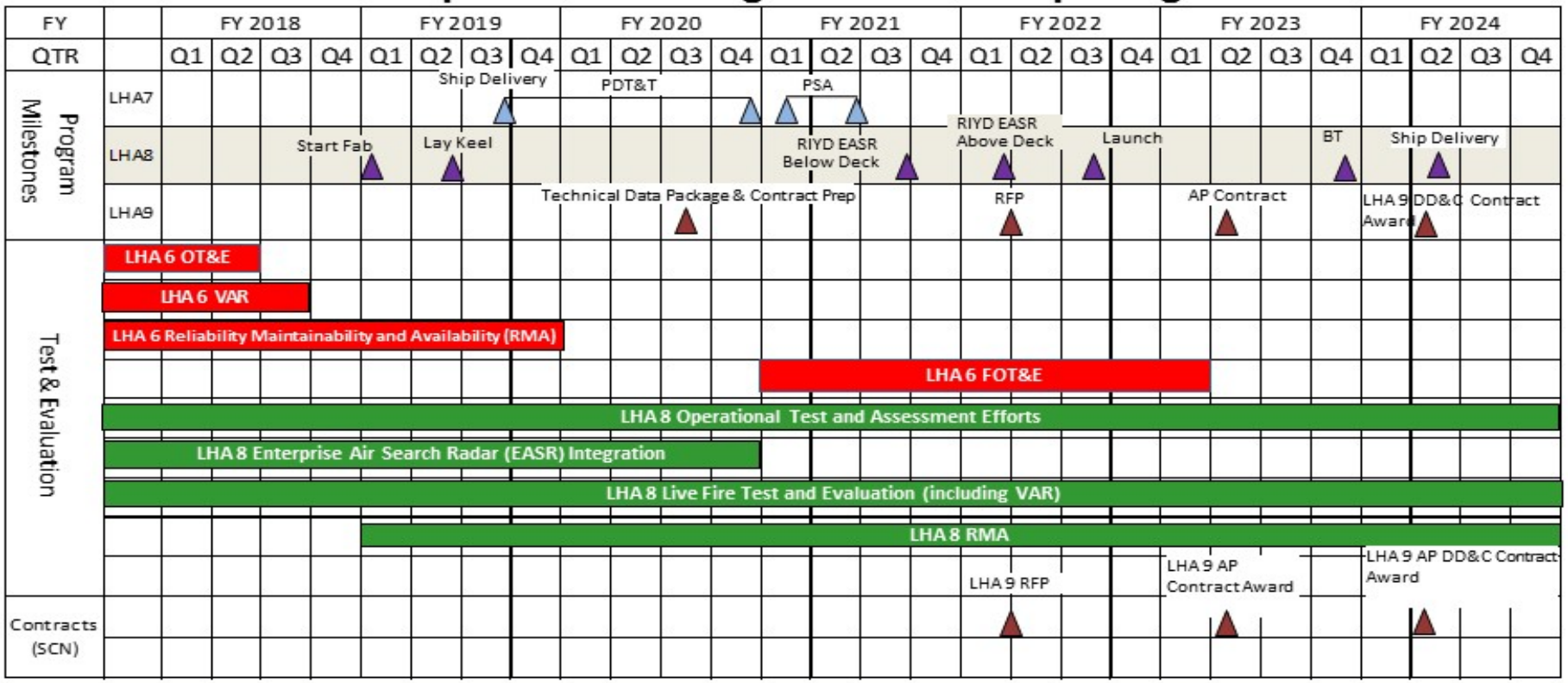
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | C/CPFF | Various : Various | 16.247 | 0.054 | Dec 2017 | 0.083 | Dec 2018 | 0.080 | Dec 2019 | - | | 0.080 | Continuing | Continuing | Continuing |
| Travel | Various | NAVSEA Travel : Washington, DC | 0.763 | 0.000 | Dec 2017 | 0.005 | Dec 2018 | 0.005 | Dec 2019 | - | | 0.005 | Continuing | Continuing | Continuing |
| Defense Acquisition Workforce | Various | Various : Various | 0.011 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.011 | - |
| | | **Subtotal** | 17.021 | 0.054 | | 0.088 | | 0.085 | | - | | 0.085 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 259.734 | 8.135 | | 6.841 | | 2.311 | | - | | 2.311 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>2465 / *LHA(R) FLT Design and Total Ship Integration* |

# LHA Replacement Design and Total Ship Integration




| | | | |
|---|---|---|---|
| DD&C - Detail Design and Construction | EASR – Enterprise Air Search Radar | FOT&E – Follow-on Operational Test and Evaluation | OWLD - Obligation Work Limiting Date |
| PSA - Post Shakedown Availability | PDT&T – Post Delivery Test and Trials | AP – Advanced Procurement | LFT&E - Live Fire Test and Evaluation |
| RIYD - Required In-Yard Date | RMA – Reliability, Maintainability, Availability | RFP – Request for Proposals | VAR - Vulnerability Assessment Report |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>2465 / *LHA(R) FLT Design and Total Ship Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2465*** | | | | |
| LHA (R) FLT Design and Total Ship Integration | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>3108 / *CVN 80 Total Ship Integration* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3108: *CVN 80 Total Ship Integration* | 30.231 | 32.161 | 31.563 | 23.941 | - | 23.941 | 25.105 | 25.703 | 26.218 | 26.745 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 223

**A. Mission Description and Budget Item Justification**

Development and related testing of CVN 78 Class aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers, and the potential realization of subsystem design capabilities not currently feasible. This project also funds the Contract Design efforts for the CVN 80. This project transitions the minimum sustaining technologies required to address obsolescence, critical survivability shortfalls as identified in CVN 78 Class testing, future requirements, and technologies which did not mature in time to support the CVN 78 or CVN 79. All systems developed in this project have the potential to support emerging requirements and other promising system technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation, warfare systems, and combat support systems, sub-systems and components to maintain aircraft carrier affordability, manpower requirements, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers. This project also encompasses those tasks required to support CVN 80 procurement, including, but not limited to engineering support, programmatic and program support, modeling and simulation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Enterprise Radar Suite (ERS) | 8.967 | 8.620 | 5.566 | 0.000 | 5.566 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue conducting / preparing risk reduction studies / reports, to include management of a risk / opportunity database to support decision making. Continue conducting technology assessment studies. Continue execution of Requirements Engineering and Architecture, including maintaining a radar specification traceability matrix to the CVN ORD and maintenance of a new CVN Warfare System architecture. Continue to conduct ship integration studies for GFI vetting, tracking and delivery. Continue conducting onboard and off-board Electromagnetic Interference / Control (EMI / EMC) studies due to the new radar sensor suite. Continue analyzing / performing integrated topside design due to new radar sensor suite. Continue conducting power interface trade studies based upon radar prime power requirement and conduct trade studies to analyze platform power against transformer design and platform power against cost of ship modification. Continue conducting system integration studies related to the TEMP; platform impacts & updates to TEMP; cybersecurity analysis; | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3108 / *CVN 80 Total Ship Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and ISP updates supporting Net Ready KPP. Continue conducting RMA and ILS studies, to include trade studies and identification of investment opportunities / requirements. Continue preparing / updating acquisition support documents and cost estimates. Continue operation of the Integrated Product Team to include vendor, shipbuilder and Government. Participate in Preliminary and Critical Design Reviews of Warfare System elements.<br>***FY 2020 Base Plans:***<br>Continue conducting / preparing risk reduction studies / reports, to include management of a risk / opportunity database to support decision making. Continue to maintain a radar specification traceability matrix to the CVN ORD and maintenance of a new CVN Warfare System architecture. Continue to conduct ship integration studies for GFI vetting, tracking and delivery. Continue conducting onboard and off-board EMI / EMC studies due to new the radar sensor suite. Continue analyzing / performing integrated topside design due to the new radar sensor suite. Continue conducting power interface trade studies based upon radar prime power requirement and conduct trade studies to analyze platform power against transformer design and platform power against cost of ship modification. Start ERS integration testing with the Combat System. Continue conducting system integration studies related to the TEMP; platform impacts & updates to TEMP; cybersecurity analysis. Continue conducting RMA and ILS studies, to include trade studies and identification of investment opportunities / requirements. Continue preparing / updating acquisition support documents and cost estimates. Continue operation of the Integrated Product Team to include vendor, shipbuilder and Government.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to planned phasing of requirements. | | | | | |
| ***Title:*** CVN 78 Class Design for Affordability (DFA) | 23.194 | 22.943 | 18.375 | 0.000 | 18.375 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue conducting or supporting feasibility and tradeoff studies on new and modified shipboard systems and equipment. Continue to discover and assess CVN 78 Class DFA initiatives. Continue development of cost-saving initiatives, game changers, business case analyses, and DFA initiatives to continue to drive affordability into the carrier program. Continue performing CVN 80-specific engineering calculations and technical analysis in the areas of technical performance measures; system component calculations; environmental safety and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3108 / *CVN 80 Total Ship Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| health, and human factors engineering; survivability and vulnerability; automation systems software; shock and vibration; and engineered components support.<br>***FY 2020 Base Plans:***<br>Continue conducting and supporting feasibility and tradeoff studies on new and modified shipboard systems and equipment for FORD Class carriers. Continue to discover and assess FORD Class DFA initiatives. Continue development and implementation of cost-saving initiatives, game changers, business case analyses, and DFA initiatives that continue to drive affordability into the carrier program. Continue performing CVN 80-specific engineering calculations and technical analysis. Continue to support prototyping efforts for iDS transformation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to planned phasing of requirements. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 32.161 | 31.563 | 23.941 | 0.000 | 23.941 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN / 2001: *Carrier Replacement Program* | 4,130.704 | 1,573.181 | 2,347.000 | - | 2,347.000 | 2,644.700 | 2,323.613 | 1,929.000 | 1,718.000 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 20.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,394.860 |
| • RDTEN / 0604112N: *Project Units 2208, 4004, 9999* | 82.549 | 83.121 | 121.310 | - | 121.310 | 99.418 | 72.213 | 69.704 | 54.440 | Continuing | Continuing |
| • OMN / 1B2B: *CVN 78 Ford Class Training and Sustainment (12BJ0)* | 20.748 | 8.971 | 7.264 | - | 7.264 | 5.317 | 5.612 | 5.742 | 5.866 | Continuing | Continuing |
| • RDTEN / 0604501N: *Project Unit 3236 Advanced Radar Technology* | 64.690 | 23.552 | 1.933 | - | 1.933 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN / 5664: *Surface Training Equipment* | 12.010 | 7.942 | 1.412 | - | 1.412 | 4.715 | 2.796 | 2.773 | 2.834 | Continuing | Continuing |
| • OPN / 0981: *Equipment Modernization* | 0.000 | 32.900 | 8.561 | - | 8.561 | 5.849 | 10.699 | 5.210 | 0.883 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3108 / *CVN 80 Total Ship Integration* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OMN / 1B5B: *CVN 78 Modernization* | 0.000 | 0.000 | 6.440 | - | 6.440 | 1.784 | 5.366 | 17.578 | 32.224 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The CVN 80 is the third ship of the CVN 78 Class of aircraft carriers designed to replace USS ENTERPRISE and the ships of the NIMITZ Class Carriers. The CVN 80 is a modified repeat of the CVN 78, which features a new nuclear propulsion and electrical generation / distribution system, electromagnetic aircraft launching system, advanced arresting gear system, electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war-fighting benefits will be realized: increased sortie generation rate, improved ship self defense capability, increased launch and recovery capability / flexibility, increased operational availability, and increased flexibility to support future upgrades.

CVN 80 will use late integration of Government-Furnished Equipment to provide the latest combat system and C4I suite applications within the planned system baseline. CVN 80 will improve upon processes used on CVN 78 and CVN 79 to gain efficiencies during the CVN 80 Construction Preparation and Construction periods.

**E. Performance Metrics**

Successfully initiate the following tasks: 1) Development of risk impact statements, 2) Radar specification and traceability to test documents, 3) Development and maintenance of new CVN Warfare System architecture database, and 4) Development of FORD Class affordability initiatives to incorporate into the CVN 80 design and CVN 79 production as applicable.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3108 / *CVN 80 Total Ship Integration* |

**Product Development ($ in Millions)**

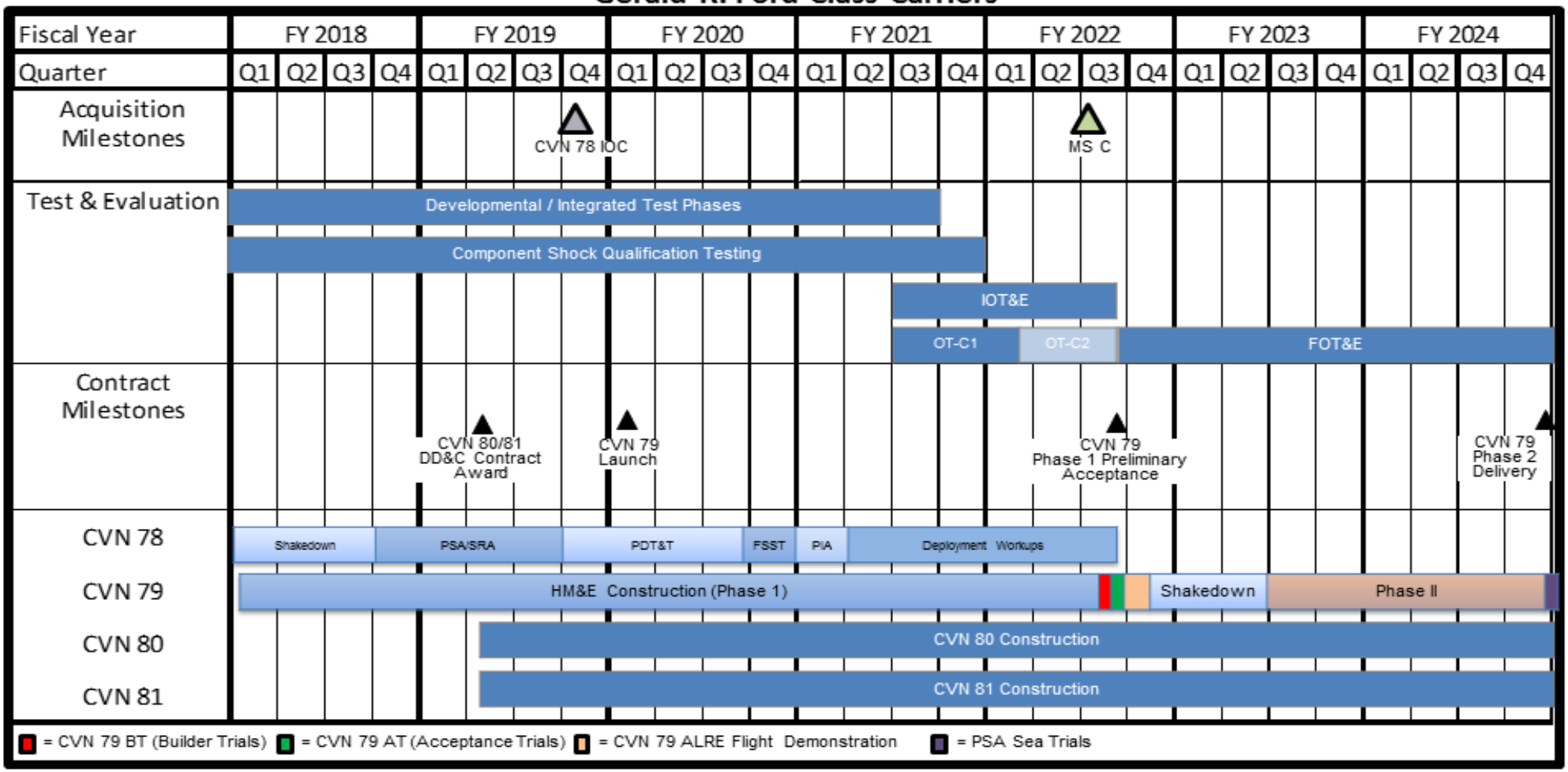
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Design & Development | C/CPAF | HII : VA | 14.097 | 14.389 | Nov 2017 | 17.540 | Nov 2018 | 12.545 | Nov 2019 | - | | 12.545 | Continuing | Continuing | Continuing |
| Advanced Design & Development | C/CPFF | GRYPHON (SEI&T) : IN | 0.956 | 1.123 | Apr 2018 | 2.500 | Nov 2018 | 0.958 | Nov 2019 | - | | 0.958 | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NSWC DAHLGREN : VA | 2.317 | 2.559 | Nov 2017 | 3.700 | Nov 2018 | 2.182 | Nov 2019 | - | | 2.182 | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NSWC CARDEROCK : MD | 1.283 | 2.250 | Nov 2017 | 1.200 | Nov 2018 | 1.919 | Nov 2019 | - | | 1.919 | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NSWC PHILADELPHIA : PA | 0.776 | 1.309 | Nov 2017 | 0.500 | Nov 2018 | 1.116 | Nov 2019 | - | | 1.116 | Continuing | Continuing | Continuing |
| Advanced Design & Development | C/CPFF | NAVSEA SEAPORT : VARIOUS | 6.206 | 8.166 | Jan 2018 | 2.353 | Dec 2018 | 3.205 | Nov 2019 | - | | 3.205 | Continuing | Continuing | Continuing |
| Advanced Design & Development | C/BA | NAWCAD PAX RIVER : MD | 1.396 | 1.045 | Nov 2017 | 1.305 | Nov 2018 | 0.891 | Nov 2019 | - | | 0.891 | Continuing | Continuing | Continuing |
| Advanced Design & Development | WR | NAWCAD LAKEHURST : NJ | 0.312 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.312 | - |
| Advanced Design & Development | WR | SPAWAR : VARIOUS | 0.528 | 0.710 | Nov 2017 | 0.490 | Nov 2018 | 0.605 | Nov 2019 | - | | 0.605 | Continuing | Continuing | Continuing |
| Advanced Design & Development | Various | NSRP : VARIOUS | 0.000 | 0.000 | | 0.835 | Dec 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Advanced Design & Development | Various | MISCELLANEOUS : VARIOUS | 2.360 | 0.610 | Dec 2017 | 1.140 | Nov 2018 | 0.520 | Nov 2019 | - | | 0.520 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 30.231 | 32.161 | | 31.563 | | 23.941 | | - | | 23.941 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 30.231 | 32.161 | | 31.563 | | 23.941 | | - | | 23.941 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3108 / *CVN 80 Total Ship Integration* |

## Gerald R. Ford Class Carriers



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3108 / *CVN 80 Total Ship Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3108*** | | | | |
| CVN 80 Total Ship Integration | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | | | | Project (Number/Name)<br>3179 / *CVN-79 Total Ship Integration* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3179: *CVN-79 Total Ship Integration* | 201.980 | 16.397 | 14.536 | 14.564 | - | 14.564 | 14.770 | 15.133 | 15.432 | 15.743 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 223

**A. Mission Description and Budget Item Justification**

Development and related testing of CVN 78 Class aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers, and the potential realization of subsystem design capabilities not currently feasible. This project also funds the Contract Design efforts for the CVN 79. This project transitions the minimum sustaining technologies required to address obsolescence, critical survivability shortfalls as identified in CVN 78 Class testing, future requirements, and technologies which did not mature in time to support the CVN 78. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation, warfare systems, and combat support systems, sub-systems and components to maintain aircraft carrier affordability, manpower requirements, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers. This project also encompasses those tasks required to develop the contract data package necessary to support CVN 79 procurement, including, but not limited to, engineering support, programmatic and program support, logistics support, modeling and simulation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment. In addition, this project focuses on significant procurement and life cycle cost reduction compared to the first ship of the class. Cost reductions are sought, developed and implemented in the areas of design, labor and material.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** CVN-79 Total Ship Integration | 16.397 | 14.536 | 14.564 | 0.000 | 14.564 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to address design, equipment and system changes between CVN 78 and CVN 79 to identify candidate equipment and / or systems that may require FOT&E. Continue to address design and construction issues based on the results of CVN 78 testing and initial operations. Continue to manage fact-of-life obsolescence changes on government-furnished equipment systems, challenges encountered on contractor-furnished equipment and material analysis. Continue to perform throughput analysis on Facility investments (Shop Lathe, Panel Line, Weather Covers, Outfitting Hall & Dry Dock) and Non-Touch Labor to solidify cost improvements. Continue CVN 79 Phase II study to develop and refine the strategy to efficiently transition from Phase I construction to Phase II and final delivery of CVN 79. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3179 / *CVN-79 Total Ship Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue to address design and construction issues based on the results of CVN 78 testing and initial operations. Continue to manage fact-of-life obsolescence changes on government-furnished equipment systems, challenges encountered on contractor-furnished equipment and material analysis. Complete development of labor savings initiatives, specifically within Steel Fabrication and Assembly (SFA) area to solidify efficiency and capacity improvements previously identified. Evaluate SFA improvement initiatives for additional areas of applicability in Final Assembly Platen (FAP) and drydock. Continue additional CVN 79 Phase II study to develop and refine the strategy to efficiently transition from Phase I construction to Phase II and final delivery of CVN 79. Refine system integration and testing strategies for implementation in CVN 79 testing program to support on time 2022 preliminary acceptance of CVN 79 by evaluating improvements needed to capitalize on CVN 78 lessons learned. Develop and implement a tailored Integrated Test Plan for CVN 79 and CVN 80 leveraging the Submarine Integration and Test Support System (SIATSS) used by Virginia Class Submarine program to manage Alteration Installation Team (AIT)- conducted testing. This CVN-specific tool will be known as the Carrier Integration and Test Support System (CIATSS).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase due to minor rate adjustments. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 16.397 | 14.536 | 14.564 | 0.000 | 14.564 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN / 2001: *Carrier Replacement Program* | 4,130.704 | 1,573.181 | 2,347.000 | - | 2,347.000 | 2,644.700 | 2,323.613 | 1,929.000 | 1,718.000 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 20.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,394.860 |
| • RDTEN / 0604112N: *Project Units 2208, 4004, 9999* | 82.549 | 83.121 | 121.310 | - | 121.310 | 99.418 | 72.213 | 69.704 | 54.440 | Continuing | Continuing |
| • OMN / 1B2B: *CVN 78 Ford Class Training and Sustainment (12BJ0)* | 20.748 | 8.971 | 7.264 | - | 7.264 | 5.317 | 5.612 | 5.742 | 5.866 | Continuing | Continuing |
| • OPN / 5664: *Surface Training Equipment* | 12.010 | 7.942 | 1.412 | - | 1.412 | 4.715 | 2.796 | 2.773 | 2.834 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3179 / *CVN-79 Total Ship Integration* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN / 0981: *Equipment Modernization* | 0.000 | 32.900 | 8.561 | - | 8.561 | 5.849 | 10.699 | 5.210 | 0.883 | Continuing | Continuing |
| • CVN 78 Modernization: *CVN 78 Modernization* | 0.000 | 0.000 | 6.440 | - | 6.440 | 1.784 | 5.366 | 17.578 | 32.224 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The CVN 78 is the first ship of the CVN 78 Class of aircraft carriers designed to replace USS ENTERPRISE and the ships of the NIMITZ Class. The CVN 78 class will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system (EMALS), advanced arresting gear (AAG) system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war fighting benefits will be realized: increased sortie generation rate, improved ship self-defense capability, increased launch and recovery capability / flexibility, increased operational availability, and increased flexibility to support future upgrades.

**E. Performance Metrics**

Successfully complete system development efforts for designated new and modified shipboard system, including developmental test and evaluation documents. Successfully complete design related activities associated with integration of new and modified shipboard systems into the ship, including developmental test and evaluation documentation. Successfully perform system design and analysis studies. Successfully support design integration and analysis. Successfully complete or support feasibility and tradeoff studies on new and modified shipboard systems, technologies, and proposed modifications. Studies shall include requirements and engineering analysis; identification of subsystem, integration, and logistics impacts; cost estimates; analysis of construction schedule impacts; and conduct / support of shipchecks. Successfully provide Manpower Workload Analysis associated with design and policy activities, and with integration of new and modified system/equipment. Successfully complete the development of multiple Business Case Analyses (BCAs) that demonstrate technology, process, requirements and / or infrastructure improvements that will reduce the man hours (or equivalent material costs) for CVN 79 Construction.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>3179 / *CVN-79 Total Ship Integration* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Ship Integration | C/CPAF | HII : VA | 95.336 | 6.220 | Nov 2017 | 2.094 | Nov 2018 | 5.126 | Nov 2019 | - | | 5.126 | Continuing | Continuing | Continuing |
| Total Ship Integration | WR | NSWC CARDEROCK : MD | 16.067 | 0.845 | Nov 2017 | 1.170 | Nov 2018 | 0.772 | Nov 2019 | - | | 0.772 | Continuing | Continuing | Continuing |
| Total Ship Integration | WR | NSWC DAHLGREN : VA | 13.343 | 1.210 | Dec 2017 | 2.627 | Nov 2018 | 1.105 | Nov 2019 | - | | 1.105 | Continuing | Continuing | Continuing |
| Total Ship Integration | WR | NSWC PHILADELPHIA : PA | 2.345 | 0.578 | Nov 2017 | 1.170 | Nov 2018 | 0.528 | Nov 2019 | - | | 0.528 | Continuing | Continuing | Continuing |
| Total Ship Integration | WR | NAWCAD PAX RIVER : MD | 6.470 | 0.941 | Nov 2017 | 1.153 | Nov 2018 | 0.859 | Nov 2019 | - | | 0.859 | Continuing | Continuing | Continuing |
| Total Ship Integration | WR | SPAWAR : CA | 4.867 | 0.455 | Nov 2017 | 0.749 | Nov 2018 | 0.415 | Nov 2019 | - | | 0.415 | Continuing | Continuing | Continuing |
| Total Ship Integration | C/CPFF | NAVSEA SEAPORT : Various | 28.847 | 2.466 | Nov 2017 | 2.467 | Dec 2018 | 2.252 | Dec 2019 | - | | 2.252 | Continuing | Continuing | Continuing |
| Total Ship Integration | C/CPAF | RAYTHEON : MA | 9.784 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Total Ship Integration | WR | SSC CHARLESTON : SC | 0.841 | 0.298 | Jan 2018 | 0.000 | | 0.272 | Nov 2019 | - | | 0.272 | 0.000 | 1.411 | - |
| Total Ship Integration | C/CPFF | SAIC : VA | 1.445 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.445 | - |
| Total Ship Integration | Various | NSRP : Various | 15.596 | 1.670 | Mar 2018 | 0.835 | Dec 2018 | 1.670 | Dec 2019 | - | | 1.670 | Continuing | Continuing | Continuing |
| Total Ship Integration | C/CPFF | GRYPHON (SEI&T) : IN | 0.800 | 1.129 | Nov 2017 | 0.780 | Dec 2018 | 1.031 | Dec 2019 | - | | 1.031 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 195.741 | 15.812 | | 13.045 | | 14.030 | | - | | 14.030 | Continuing | Continuing | N/A |

**Remarks**

- HII increased to resolve technical issues that have resulted from CVN 78 post-delivery tests.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NSWC CARDEROCK : MD | 4.721 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.721 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3179 / *CVN-79 Total Ship Integration* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NUWC NEWPORT : RI | 0.123 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | NSWC DAHLGREN : VA | 0.921 | 0.341 | Nov 2017 | 1.137 | Nov 2018 | 0.311 | Nov 2019 | - | | 0.311 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | TBD | MISCELLANEOUS : TBD | 0.017 | 0.014 | Nov 2017 | 0.124 | Dec 2018 | 0.013 | Dec 2019 | - | | 0.013 | Continuing | Continuing | Continuing |
| Operational Test & Evaluation | C/CPFF | FLC : VA | 0.276 | 0.230 | Dec 2017 | 0.230 | Nov 2018 | 0.210 | Nov 2019 | - | | 0.210 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.058 | 0.585 | | 1.491 | | 0.534 | | - | | 0.534 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

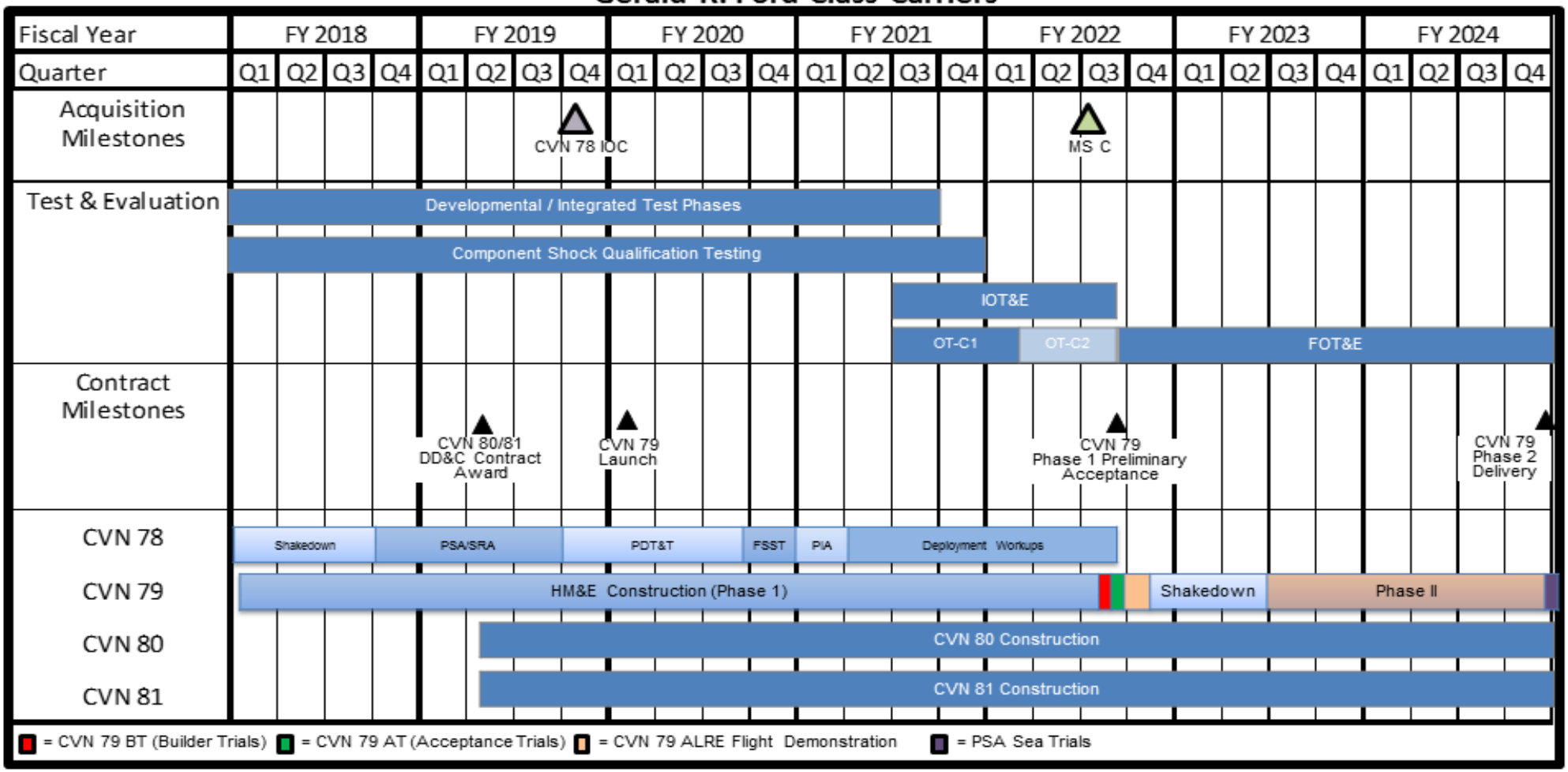
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Defense Acquisition Workforce | Various | Various : Misc | 0.181 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.181 | - |
| | | **Subtotal** | 0.181 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.181 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 201.980 | 16.397 | | 14.536 | | 14.564 | | - | | 14.564 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3179 / *CVN-79 Total Ship Integration* |

## Gerald R. Ford Class Carriers



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3179 / *CVN-79 Total Ship Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3179*** | | | | |
| CVN 79 Total Ship Integration | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>3369 / *Hybrid Electric Drive* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3369: *Hybrid Electric Drive* | 13.218 | 0.982 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 14.200 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This project includes the DON Energy Initiative related to the DDG 51 Hybrid Electric Drive to reduce DDG 51 Class ship energy consumption and increase mission effectiveness through longer time on station. This project supports propulsion at low ship speeds without the need for LM 2500 main engines. Fuel savings from the Hybrid Electric Drive system will be achieved by utilizing fewer gas turbines for propulsion and ship service power generation while also loading gas turbines generators at a more efficient operating load. Provides critical foundation for SECNAV and CNO objectives to achieve greater Navy-wide energy security. The HED program has been truncated to two installations. The operational data collected from the two ships from a deployment cycle (usage/energy savings/efficiencies) will determine future installations.

Note: FY 2014 and prior year funding is resourced under project 1803 in this program element.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** DON Energy Initiative | 0.982 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project is a DON Energy Initiative related to the DDG 51 Hybrid Electric Drive (HED) to reduce DDG 51 Class ship energy consumption and increase mission effectiveness through longer time on station. | | | | | |
| ***FY 2019 Plans:***<br>Program has been cancelled. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.982 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3369 / *Hybrid Electric Drive* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN 0140: *Hybrid Electric Drive (HED)* | 6.331 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 46.585 | 105.643 |

**Remarks**

**D. Acquisition Strategy**

The HED program has been truncated to two installations. The operational data collected from the two ships from a deployment cycle (usage/energy savings/ efficiencies) will determine future installations.

**E. Performance Metrics**

Completion of Engineering Development Model (EDM) and complete fielding of First Article (FA) including contract award, design, manufacturing, and delivery. Completion of Factory Acceptance Test (FAT) and performance testing in Land Based Engineering Site (LBES). Commencement, completion, delivery and installation of Low Rate Initial Production (LRIP) units. Achieve fuel efficiency and increase on-station time.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>3369 / *Hybrid Electric Drive* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DON Energy Initiative - OEM | C/FPIF | L-3 Maritime Systems : Leesburg, VA | 3.133 | 0.282 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.415 | - |
| | | **Subtotal** | 3.133 | 0.282 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.415 | N/A |

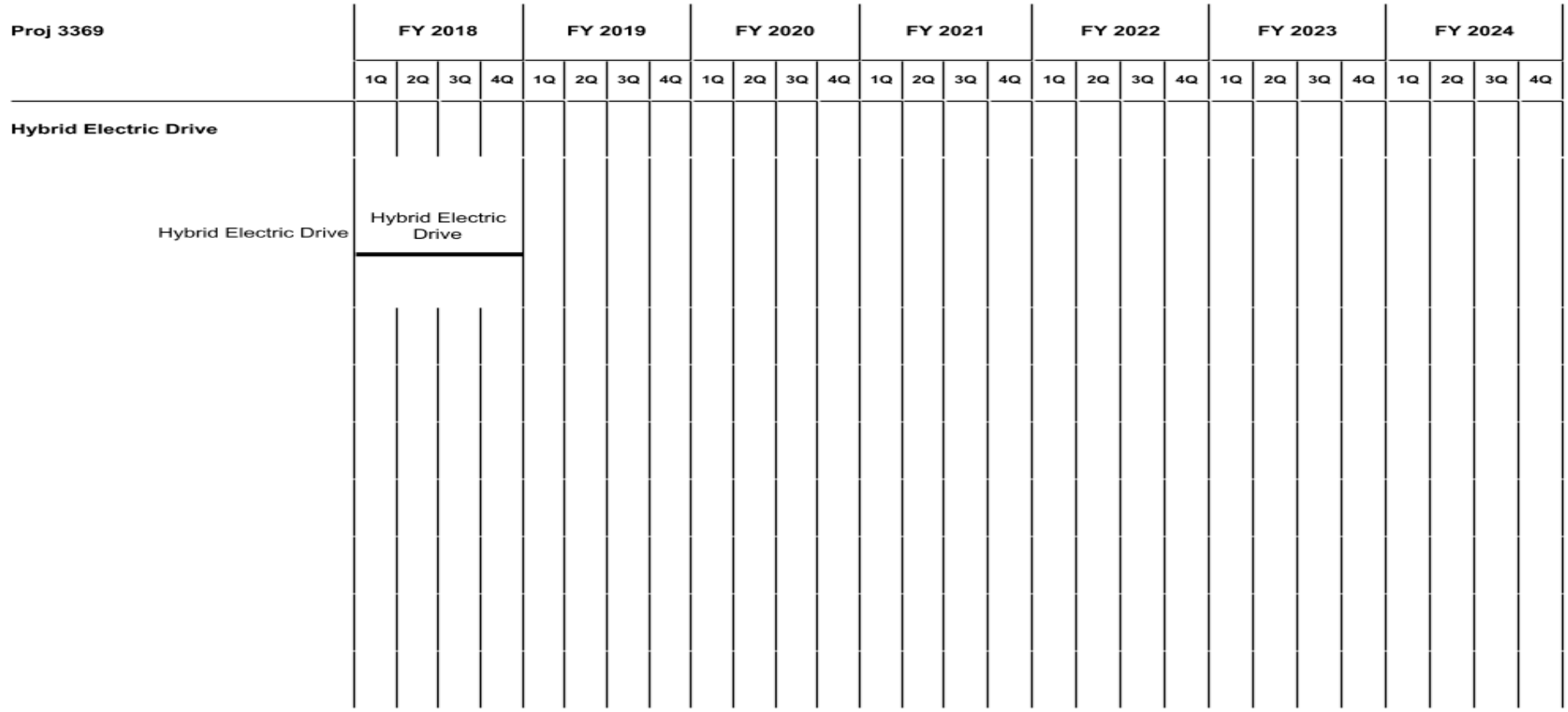
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HED - DON Energy Initiative -OEM | WR | NSWC/SSES : Philadelphia, PA | 9.460 | 0.700 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.160 | - |
| HED - DON Energy Initiative -OEM | Various | SUPSHIP BATH : Bath, ME | 0.325 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.325 | - |
| HED - DON Energy Initiative -OEM | Various | SYNTEK TECHNOLOGIES : Arlington, VA | 0.300 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| | | **Subtotal** | 10.085 | 0.700 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.785 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 13.218 | 0.982 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.200 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3369 / *Hybrid Electric Drive* |




*2020DON - 0604567N - 3369*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>3369 / *Hybrid Electric Drive* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3369*** | | | | |
| Hybrid Electric Drive: Hybrid Electric Drive: Hybrid Electric Drive | 1 | 2018 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>4007 / *CVN 21 LFT&E* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4007: *CVN 21 LFT&E* | 69.451 | 3.919 | 4.011 | 4.054 | - | 4.054 | 4.177 | 4.290 | 4.374 | 4.461 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 223

**A. Mission Description and Budget Item Justification**

This project encompasses Live Fire Test and Evaluation (LFT&E) efforts for the CVN 78 Class. Title 10, US Code, Section 2366, CVN 21 Operational Requirements Document (ORD) and the CVN 78 Class Test and Evaluation Master Plan (TEMP) 1610 prescribe requirements for LFT&E. The purpose of LFT&E is to evaluate covered systems in a realistic combat environment before proceeding beyond low-rate initial production. Since the application of the survivability testing required by 10 USC 2366 to a CVN 78 Class ship would be unreasonably expensive and impractical, the Secretary of Defense waived the live fire testing requirement in 2004 and submitted a certification of that determination to Congress. The CVN 78 Class LFT&E Management Plan details the testing, modeling and simulation, and engineering analyses that are being used to determine whether CVN 78 Class ships will be able to survive and carry out their missions against the threat weapons identified in the Surface Ship Capstone System Threat Assessment Report (CSTAR) that are likely to be encountered in combat. The results of these tests and analyses are documented in periodic Vulnerability Assessment Reports (VARs).

The CVN 78 Class VAR 3 was completed in the summer of 2007 and the CVN 78 Class VAR 4 is scheduled to be completed in FY 18.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** CVN 21 LFT&E | 3.919 | 4.011 | 4.054 | 0.000 | 4.054 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete the analyses for the analytical bridge studies and complete the report. Continue planning for the CVN 78 Total Ship Survivability Trial (TSST) with the development of the TSST drill guides and implementation sheets. Perform a cold check on CVN 78 in support of TSST planning. Continue analyses and documentation for the final SAR. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue planning for the CVN 78 TSST with the development of the TSST drill guides and implementation sheets. Perform a cold check on CVN 78 in support of TSST planning. Continue analyses and documentation for the final SAR. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>4007 / *CVN 21 LFT&E* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase due to inflation. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.919 | 4.011 | 4.054 | 0.000 | 4.054 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN / 2001: *Carrier Replacement Program* | 4,130.704 | 1,573.181 | 2,347.000 | - | 2,347.000 | 2,644.700 | 2,323.613 | 1,929.000 | 1,718.000 | Continuing | Continuing |
| • SCN / 5300: *Completion of Prior Year Shipbuilding Programs* | 20.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,394.860 |
| • RDTEN / 0604112N: *Project Units 2208, 4004, 9999* | 82.549 | 83.121 | 121.310 | - | 121.310 | 99.418 | 72.213 | 69.704 | 54.440 | Continuing | Continuing |
| • OMN / 1B2B: *CVN 78 Ford Class Training and Sustainment (12BJ0)* | 20.748 | 8.971 | 7.264 | - | 7.264 | 5.317 | 5.612 | 5.742 | 5.866 | Continuing | Continuing |
| • OPN / 5664: *Surface Training Equipment* | 12.010 | 7.942 | 1.412 | - | 1.412 | 4.715 | 2.796 | 2.773 | 2.834 | Continuing | Continuing |
| • OPN / 0981: *Equipment Modernization* | 0.000 | 32.900 | 8.561 | - | 8.561 | 5.849 | 10.699 | 5.210 | 0.883 | Continuing | Continuing |
| • OMN / 1B5B: *CVN 78 Modernization* | 0.000 | 0.000 | 6.440 | - | 6.440 | 1.784 | 5.366 | 17.578 | 32.224 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The CVN 78 is the first ship of the CVN 78 Class of aircraft carriers designed to replace USS ENTERPRISE and the ships of the NIMITZ Class. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system (EMALS), advanced arresting gear (AAG) system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the NIMITZ Class. Additionally, the following war fighting benefits will be realized: increased sortie generation rate, improved ship self-defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>4007 / *CVN 21 LFT&E* |

**E. Performance Metrics**

Complete: (1) the adjudication of final comments and updates to the CVN 78 Class LFT&E Management Plan, Revision B and route for signature; (2) the refinement of the CVN 78 structural FEM, in support of the Analytical Bridge analyses; and (3) the analyses and documentation for VAR 4 and route for signature.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>4007 / *CVN 21 LFT&E* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Live Fire Test & Evaluation | WR | NSWC Carderock : MD | 58.431 | 3.337 | Oct 2017 | 2.897 | Nov 2018 | 3.402 | Nov 2019 | - | | 3.402 | Continuing | Continuing | Continuing |
| Live Fire Test & Evaluation | C/CPAF | HII : VA | 10.651 | 0.507 | Apr 2018 | 0.950 | Nov 2018 | 0.575 | Nov 2019 | - | | 0.575 | Continuing | Continuing | Continuing |
| Live Fire Test & Evaluation | WR | NSWC Dahlgren : VA | 0.359 | 0.075 | Jun 2018 | 0.082 | Nov 2018 | 0.077 | Nov 2019 | - | | 0.077 | Continuing | Continuing | Continuing |
| Live Fire Test & Evaluation | C/CPFF | NAVSEA SEAPORT : DC | 0.000 | 0.000 | | 0.082 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.082 | - |
| | | **Subtotal** | 69.441 | 3.919 | | 4.011 | | 4.054 | | - | | 4.054 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

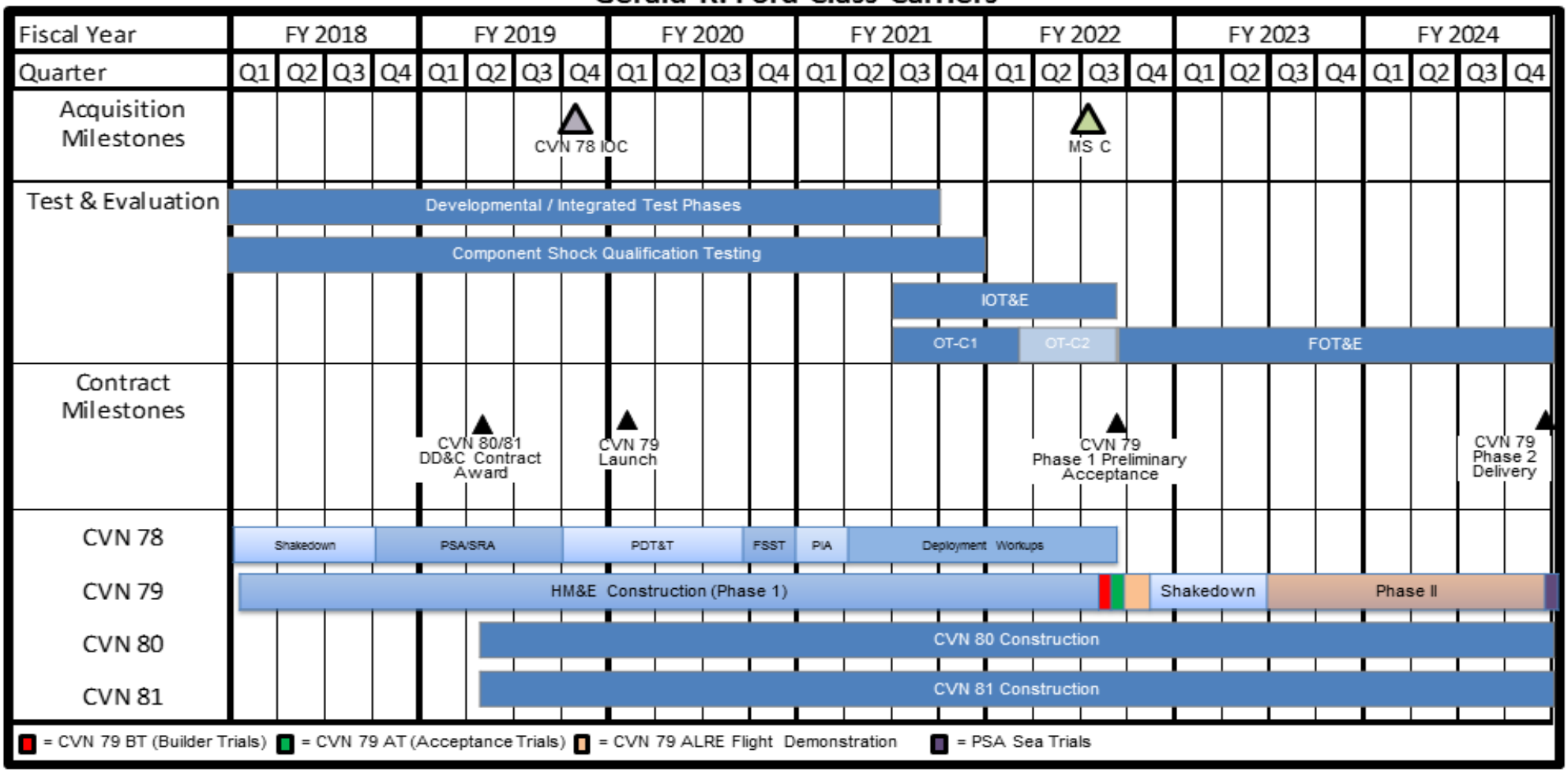
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Defense Acquisition Workforce | TBD | Various : Various | 0.010 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.010 | - |
| | | **Subtotal** | 0.010 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.010 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 69.451 | 3.919 | | 4.011 | | 4.054 | | - | | 4.054 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>4007 / *CVN 21 LFT&E* |

## Gerald R. Ford Class Carriers



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>4007 / *CVN 21 LFT&E* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4007*** | | | | |
| CVN 21 LFT&E | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 19.343 | 0.452 | 11.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 30.795 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

These projects provide for the Congressional add to Maritime Prepositioning Force (Future), DDG 51 Advance Degaussing Mine Protection System Retrofit, and Planning to Support FY 2021 Award of LHA-9.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Maritime Prepositioning Force (Future) - Transfer from NDSF<br>***FY 2018 Accomplishments:*** Performed tracking execution of Test and Evaluation schedule to Test and Evaluation Master Plan (TEMP)<br>- Completed Initial Operational Test and Evaluation (IOT&E) Phase 2 for Expeditionary Sea Base (ESB)<br>- Completed Total Ship Survivability Trial (TSST) and Final Survivability Assessment Report (FSAR) for Expeditionary Sea Base (ESB) Live Fire Test and Evaluation (LFT&E).<br>***FY 2019 Plans:*** Completion of Operational Testing and final test report. | 0.452 | 0.000 |
| ***Congressional Add:*** DDG 51 Advance Degaussing Mine Protection System Retrofit<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** To study the technical feasibility and impacts to existing space and arrangements in order to determine the most cost-effective degaussing solution that meets current signature requirements. This study will allow for developed and prototype Advanced Degaussing (ADG) designs to be matured and optimized for the DDG 51 Class for both retrofit and new construction ships (forward fit). These funds will develop and validate an Advanced Degaussing design and degaussing loop arrangement to be approved by the technical community; as well as cost and schedule to back fit either a High-Temperature Superconducting Degaussing Coil System (HTS) or copper system. | 0.000 | 5.000 |
| ***Congressional Add:*** Planning to Support FY 2021 Award of LHA-9<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Complete technical data package (TDP) to support advanced procurement of long lead time material for LHA 9. | 0.000 | 6.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| Initiate acquisition documentation development to support LHA 9 contract actions. | | |
| **Congressional Adds Subtotals** | 0.452 | 11.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Supplement the current maritime prepositioning force and to provide in theater capability to support resupplying a Maritime Expeditionary Brigade.

**E. Performance Metrics**

Annual Program Review

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CVN Total Ship Integration | C/CPAF | HII : VA | 16.838 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 16.838 | - |
| CVN Total Ship Integration | C/CPFF | AT Kearney : DC | 1.709 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.709 | - |
| CVN Total Ship Integration | WR | NSWC Carderock : MD | 0.350 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.350 | - |
| CVN Total Ship Integration | WR | NSWC Philadelphia : PA | 0.446 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.446 | - |
| LHA 9 Contract Design/ Acquisition Planning | Various | Not Specified : Not Specified | 0.000 | 0.000 | | 6.000 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 6.000 | - |
| DDG 51 Advance Degaussing Mine Protection System Retrofit | C/CPAF | SUPSHIP/BATH: BATH : ME | 0.000 | 0.000 | | 1.250 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.250 | - |
| DDG 51 Advance Degaussing Mine Protection System Retrofit | WR | NSWC/SSES: Philadelphia : PA | 0.000 | 0.000 | | 1.250 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.250 | - |
| DDG 51 Advance Degaussing Mine Protection System Retrofit | WR | NSWC/ Carderock : MD | 0.000 | 0.000 | | 2.500 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.500 | - |
| | | **Subtotal** | 19.343 | 0.000 | | 11.000 | | 0.000 | | - | | 0.000 | 0.000 | 30.343 | N/A |

**Remarks**

PY updated for actuals (PU C295 CVN Cost Reduction Activities).

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESB Operational Test and Evaluation | Various | Not Specified : Not Specified | 0.000 | 0.200 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| ESB Live Fire Test and Evalution | Various | Not Specified : Not Specified | 0.000 | 0.252 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.252 | - |
| | | **Subtotal** | 0.000 | 0.452 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.452 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

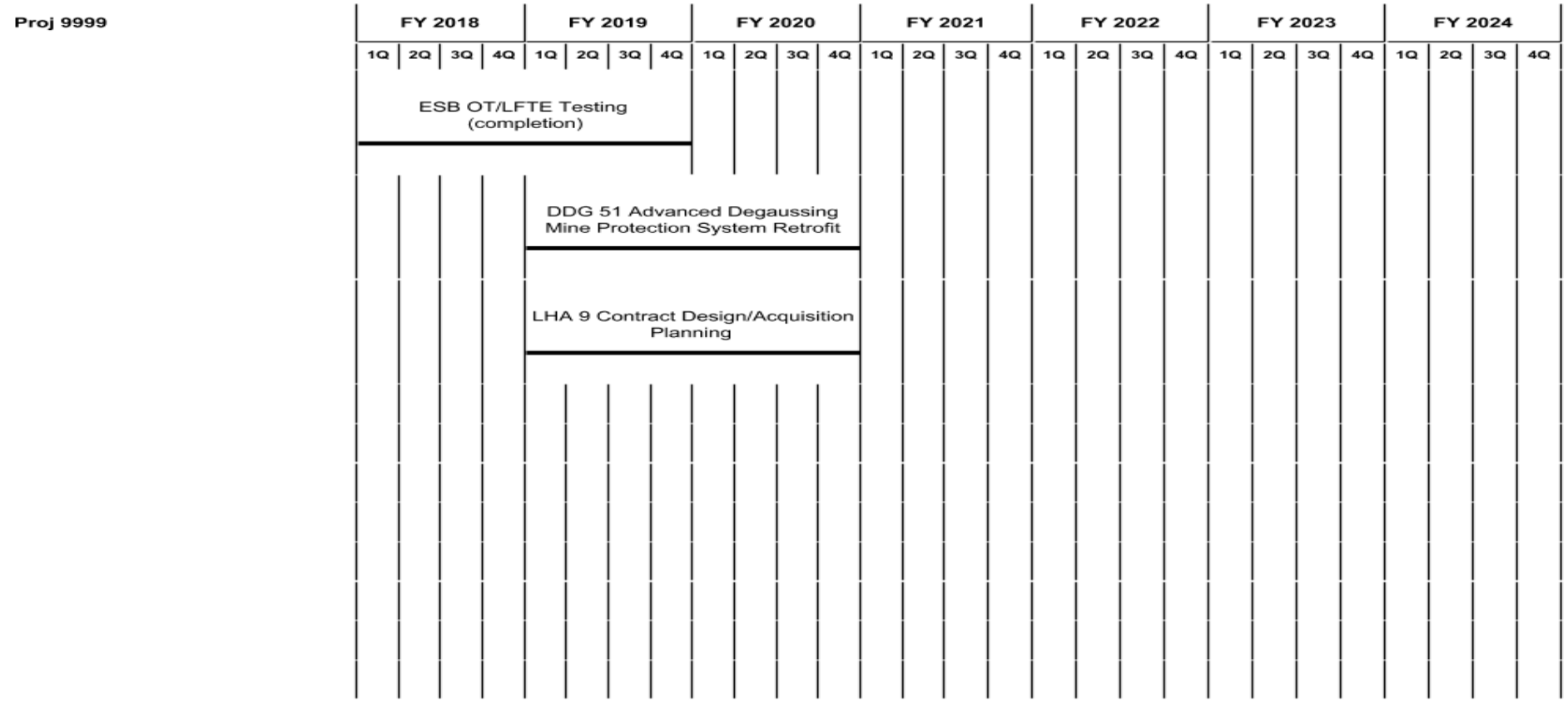
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Remarks** | | | | | | | | | | | | | | | |
| Award dates reflect initial award of incremental execution. | | | | | | | | | | | | | | | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 19.343 | 0.452 | | 11.000 | | 0.000 | | - | | 0.000 | 0.000 | 30.795 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604567N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604567N / *Ship Contract Design/ Live Fire T&E* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Completion of ESB OT/LFTE Testing | 1 | 2018 | 4 | 2019 |
| DDG 51 Advance Degaussing Mine Protection System Retrofit | 1 | 2019 | 4 | 2020 |
| LHA 9 Contract Design/Acquisition Planning | 1 | 2019 | 4 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604574N *I Navy Tactical Computer Resources* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 10.996 | 4.745 | 4.642 | 3.692 | - | 3.692 | 4.192 | 4.210 | 4.163 | 4.247 | Continuing | Continuing |
| 3360: *Common Processing System (CPS)* | 3.521 | 1.658 | 1.599 | 1.445 | - | 1.445 | 1.478 | 1.508 | 1.541 | 1.572 | Continuing | Continuing |
| 3361: *Common Display System (CDS)* | 7.475 | 3.087 | 3.043 | 2.247 | - | 2.247 | 2.714 | 2.702 | 2.622 | 2.675 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The Common Processing System (CPS) and Common Display System (CDS) programs support developing technology insertions in a competitively sourced environment. CPS & CDS provide technical replacements for obsolete display and processing equipment (such as AN/UYQ-70) for multiple warfare systems aboard Surface Combatants and Large Deck class ships.

CPS provides computer processing and memory, data storage and extraction, and Input/Output (I/O) interface to support hosting Navy combat system software applications and computing resources. These upgrades support AEGIS Modernization, AEGIS new construction, AEGIS Ashore, Ship Self Defense System (SSDS) MK2, Surface Electronic Warfare Improvement Program (SEWIP), and other Navy programs. Funding provides for technical management and Engineering Change Proposals (ECP) development for the common baseline. Procurement and development funds provided by user programs to support program unique requirements.

CDS provides operator display consoles with a common human machine interface to support the Combat System operations. These upgrades support AEGIS modernization, AEGIS new construction, AEGIS Ashore, DDG-1000, Ship Self Defense System (SSDS) MK 2, Gun Weapon System (GWS), and SEWIP. Funding provides for technical management and Engineering Change Proposals (ECP) development for the common baseline. Procurement and development funds provided by user programs to support program unique requirements.

| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| Previous President's Budget | 4.817 | 4.642 | 4.022 | - | 4.022 |
| Current President's Budget | 4.745 | 4.642 | 3.692 | - | 3.692 |
| Total Adjustments | -0.072 | 0.000 | -0.330 | - | -0.330 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.073 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.330 | - | -0.330 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0604574N *I Navy Tactical Computer Resources* | | | |
| • Rate/Misc Adjustments | 0.001 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

FY 2018 decrease for SBIR reduction and rate adjustment

FY 2020 decreased by $.330 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604574N / *Navy Tactical Computer Resources* | Project (Number/Name)<br>3360 / *Common Processing System (CPS)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3360: *Common Processing System (CPS)* | 3.521 | 1.658 | 1.599 | 1.445 | - | 1.445 | 1.478 | 1.508 | 1.541 | 1.572 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Common Processing System (CPS) program supports developing open architecture computer processing hardware and storage technology in a competitively sourced environment. CPS provides technical replacements for obsolete processing equipment (such as AN/UYQ-70) for multiple warfare systems aboard Surface Combatants and Large Deck class ships. CPS provides computer processing and memory, data storage and extraction, and Input/Output (I/O) interface to support hosting Navy combat system software applications and computing resources. These upgrades support AEGIS Modernization, AEGIS new construction, Ship Self Defense System (SSDS) MK2, Surface Electronic Warfare Improvement Program (SEWIP), and other Navy programs. Funding provides for technical management and Engineering Change Proposals (ECP) development for the common baseline. Procurement and development funds provided by user programs to support program unique requirements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Common Processing System (CPS) | 1.658 | 1.599 | 1.445 | 0.000 | 1.445 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue system engineering support of CPS TI-16 development efforts required to support various Combat and Weapon System Configurations. Support Engineering Analysis of issues identified within field configuration TI-12 to develop resolution plan to improve reliability, readiness, or reduce operating costs. Support System Engineering efforts required to achieve Program Readiness Review (PRR) for TI-20 milestone in 4th quarter. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue system engineering support of CPS TI-16 development efforts required to support various Combat and Weapon System Configurations. Support Engineering Analysis of issues identified within field configuration TI-12 to develop resolution plan to improve reliability, readiness, or reduce operating costs. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3360 / *Common Processing System (CPS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Decrease due to reduction in planned efforts to identify and resolve TI issues within configuration under development and fielded. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.658 | 1.599 | 1.445 | 0.000 | 1.445 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

CPS TI-16: Award build to Print Indefinite Delivery Indefinite Quantity (IDIQ) production contract for FY18-FY21.

**E. Performance Metrics**

Major Milestones:
CPS TI-20 In Process Review No. 2 first quarter FY18.
CDP TI-20 Preliminary Design Review third quarter FY18.
CPS TI-20 Production Readiness Review fourth quarter FY19.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3360 / *Common Processing System (CPS)* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NSWC : PHD | 0.010 | 0.240 | Oct 2017 | 0.147 | Oct 2018 | 0.152 | Oct 2019 | - | | 0.152 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC : Dahlgren | 2.144 | 0.758 | Nov 2017 | 0.785 | Nov 2018 | 0.709 | Oct 2019 | - | | 0.709 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPIF | TBD : TBD | 1.229 | 0.605 | Dec 2017 | 0.607 | Oct 2018 | 0.000 | Oct 2019 | - | | 0.000 | 0.000 | 2.441 | - |
| | | **Subtotal** | 3.383 | 1.603 | | 1.539 | | 0.861 | | - | | 0.861 | Continuing | Continuing | N/A |

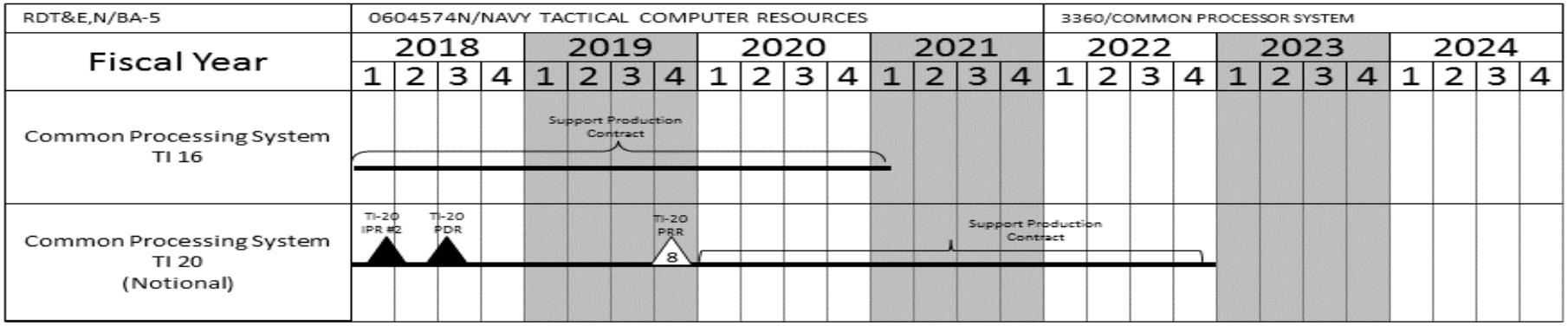
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Services | Various | Various : Various | 0.138 | 0.055 | Oct 2017 | 0.060 | Oct 2018 | 0.584 | Oct 2019 | - | | 0.584 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.138 | 0.055 | | 0.060 | | 0.584 | | - | | 0.584 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 3.521 | 1.658 | | 1.599 | | 1.445 | | - | | 1.445 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3360 / *Common Processing System (CPS)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3360 / *Common Processing System (CPS)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3360*** | | | | |
| CPS TI 20 In Progress Review (IPR) No. 2 (Completed) | 1 | 2018 | 1 | 2018 |
| CPS TI 20 PDR (Completed) | 3 | 2018 | 3 | 2018 |
| CPS TI 20 PRR | 4 | 2019 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604574N / *Navy Tactical Computer Resources* | Project (Number/Name)<br>3361 / *Common Display System (CDS)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3361: *Common Display System (CDS)* | 7.475 | 3.087 | 3.043 | 2.247 | - | 2.247 | 2.714 | 2.702 | 2.622 | 2.675 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Common Display System (CDS) programs support developing technology insertions in a competitively sourced environment. CDS provide technical replacements for obsolete display and processing equipment (such as AN/UYQ-70) for multiple warfare systems aboard Surface Combatants and Large Deck class ships. CDS provides operator display consoles with a common human machine interface to support the Combat System operations. These upgrades support AEGIS modernization, AEGIS new construction, AEGIS Ashore, DDG-1000, Ship Self Defense System (SSDS) MK 2, Gun Weapon System (GWS), and SEWIP. Funding provides for technical management and Engineering Change Proposals (ECP) development for the common baseline. Procurement and development funds provided by user programs to support program unique requirements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Common Display System (CDS) | 3.087 | 3.043 | 2.247 | 0.000 | 2.247 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue system engineering support of CDS TI-12 / TI-16 development efforts required to support various Combat and Weapon System Configurations. Support Engineering Analysis of issues identified within field configuration TI-12 to develop resolution plan to improve reliability, readiness, or reduce operating costs. Support System Engineering efforts required to achieve Program Readiness Review (PRR) for TI-20 milestone in 4th quarter. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue system engineering support of CDS TI-12 / TI-16 development efforts required to support various Combat and Weapon System Configurations. Support Engineering Analysis of issues identified within field configuration TI-12 to develop resolution plan to improve reliability, readiness, or reduce operating costs. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3361 / *Common Display System (CDS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Decrease due to reduction in planned efforts to identify and resolve TI issues within configuration under development and fielded. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.087 | 3.043 | 2.247 | 0.000 | 2.247 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Contracts:
CDS TI-16: Award build to Print IDIQ production contract for FY18-FY21.

**E. Performance Metrics**

Major Milestones:
CDS TI-20 In Process Review No. 2 first quarter FY18.
CDS TI-20 Preliminary Design Review third quarter FY18.
CDS TI-20 Production Readiness Review fourth quarter FY19.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604574N / *Navy Tactical Computer Resources* | Project (Number/Name)<br>3361 / *Common Display System (CDS)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NSWC : PHD | 0.318 | 0.212 | Dec 2017 | 0.215 | Dec 2018 | 0.187 | Dec 2019 | - | | 0.187 | Continuing | Continuing | Continuing |
| Systems Engineeing | WR | NSWC : Dahlgren | 4.793 | 1.785 | Oct 2017 | 1.585 | Oct 2018 | 1.008 | Oct 2019 | - | | 1.008 | Continuing | Continuing | Continuing |
| Systems Engineering | C/CPFF | General Dynamics : Fairfax, VA | 0.615 | 0.455 | Oct 2017 | 0.445 | Oct 2018 | 0.462 | Oct 2019 | - | | 0.462 | 0.000 | 1.977 | - |
| Systems Engineering | C/CPIF | DRS Technologies : Gaithersburg, MD | 0.675 | 0.500 | Oct 2017 | 0.455 | Dec 2018 | 0.462 | Dec 2019 | - | | 0.462 | 0.000 | 2.092 | - |
| Systems Engineering | C/CPIF | TBD : TBD | 0.797 | 0.027 | Dec 2017 | 0.243 | Oct 2018 | 0.128 | Oct 2019 | - | | 0.128 | 0.000 | 1.195 | - |
| | | **Subtotal** | 7.198 | 2.979 | | 2.943 | | 2.247 | | - | | 2.247 | Continuing | Continuing | N/A |

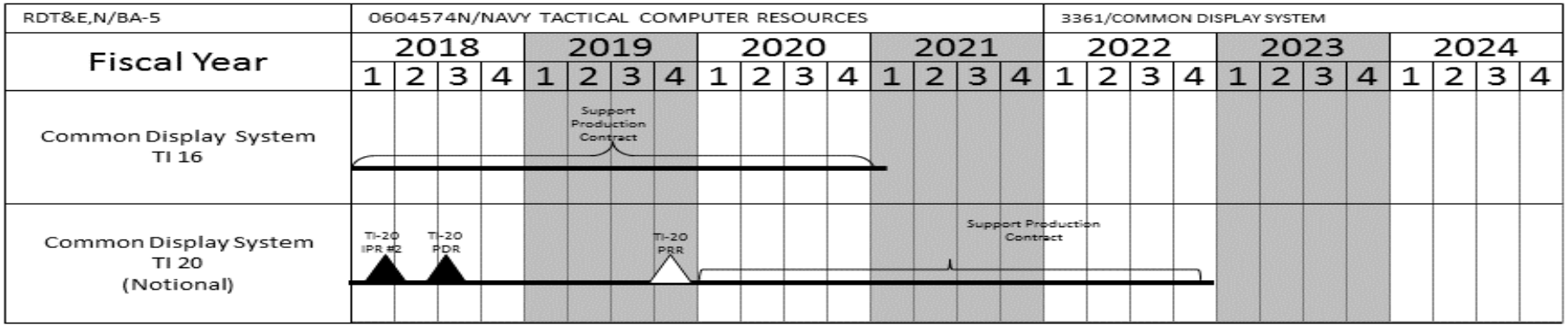
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Services | Various | Various : Various | 0.277 | 0.108 | Dec 2017 | 0.100 | Oct 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.277 | 0.108 | | 0.100 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7.475 | 3.087 | | 3.043 | | 2.247 | | - | | 2.247 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3361 / *Common Display System (CDS)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604574N / *Navy Tactical Computer Resources* | **Project (Number/Name)**<br>3361 / *Common Display System (CDS)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3361*** | | | | |
| CDS TI 20 IPR No. 2 (Completed) | 1 | 2018 | 1 | 2018 |
| CDS TI 20 Preliminary Design Review (Completed) | 3 | 2018 | 3 | 2018 |
| CDS TI 20 Production Readiness Review | 4 | 2019 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604580N *I (U)Virginia Payload Module (VPM)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 420.519 | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |
| 4500: *VIRGINIA Payload Module* | 420.519 | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 516 | | | | | | | | | | | | |

**Note**

1. Detailed design funding for this project transitions to SCN (BLI: 2013) beginning in FY17 to support VPM production beginning in FY20.

**A. Mission Description and Budget Item Justification**

The U.S. Navy must maintain a submarine fleet that is of sufficient capability and numbers to defend American interests. The VIRGINIA Class Submarine, formerly the New Attack Submarine (New SSN), is designed to fulfill this need. It will counter the potential threats of the next century in a multi- mission capable submarine that has the ability to provide covert, sustained combat presence in denied waters. The primary goal of the program is to develop an affordable yet capable submarine by evaluating a broad range of system and technology alternatives, and pursuing cost reduction, producibility improvement, and technical risk management. This Program Element (PE) provides the technology, prototype components, and systems engineering needed to design and construct the VIRGINIA Payload Module (VPM). VPM mitigates and will recapitalize the conventional TOMAHAWK Land Attack Missile (TLAM) gap created by the retirement of SSGNs in the late 2020s while maintaining current platform requirements. This PE directly supports the following VIRGINIA Class Submarine missions: (1) covert strike warfare; (2) anti-submarine warfare; (3) covert intelligence collection/surveillance, indication and warning, and electronic warfare; (4) anti-surface ship warfare; (5) special warfare; (6) mine warfare; and (7) battle group support.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 72.861 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 70.579 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -2.282 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -2.282 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604580N *I (U)Virginia Payload Module (VPM)* |

**Change Summary Explanation**

Program ends in FY19 and transitions to SCN line item 2013 Virginia Class Submarines for implementation in the pending Virginia Block V contract.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604580N / *(U)Virginia Payload Module (VPM)* | | | | Project (Number/Name)<br>4500 / *VIRGINIA Payload Module* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 4500: *VIRGINIA Payload Module* | 420.519 | 70.579 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.098 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 516

**A. Mission Description and Budget Item Justification**

This project encompasses Navy RDT&E efforts required to incorporate a modular design for future VIRGINIA Class Submarines (VCS) which integrates additional strike payload capacity for Tomahawk Land Attack and follow on missiles. The design is targeted for VCS Block V (FY19-23 ships).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Non-Propulsion Electronics System (NPES) Engineering | 10.418 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Hull, Mechanical, and Electrical (HM&E) Systems Engineering | 60.161 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 70.579 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604580N / *(U)Virginia Payload Module (VPM)* | **Project (Number/Name)**<br>4500 / *VIRGINIA Payload Module* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *VIRGINIA Class Submarine* | 5,450.911 | 7,137.077 | 9,925.498 | - | 9,925.498 | 6,123.064 | 5,968.338 | 6,080.771 | 7,052.398 | 28,976.120 | 148,078.924 |
| • OPN/0942: *Virginia Class Support Equipment* | 46.610 | 66.328 | 28.465 | - | 28.465 | 23.263 | 22.910 | 23.326 | 23.792 | Continuing | Continuing |
| • OMN/1B2B: *Ship Operational Support and Training* | 997.328 | 1,017.899 | 993.535 | - | 993.535 | 1,019.377 | 1,044.931 | 1,070.013 | 0.000 | 0.000 | 6,924.206 |
| • RDT&E/0604558N/1947: *New Design SSN HM&E* | 81.462 | 104.968 | 80.405 | - | 80.405 | 162.514 | 208.425 | 236.878 | 241.605 | Continuing | Continuing |
| • RDT&E/0604558N/1950: *New Design SSN Combat Sys Dev* | 33.767 | 40.604 | 37.485 | - | 37.485 | 36.341 | 37.138 | 37.869 | 38.626 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The VIRGINIA Class Submarine Program has implemented Integrated Product and Process Development (IPPD). The traditional distinct phasing of the design process has been replaced with the continuous concurrent engineering IPPD process. The IPPD approach has facilitated a smoother transition from design to manufacturing and has reduced the number of changes typically encountered during construction of the lead and early follow-on ships. In September 1997, Congress passed a law allowing General Dynamics Electric Boat (GDEB) and Northrop Grumman Newport News (NGNN), now Huntington Ingalls Industries - Newport News Shipbuilding (HII-NNS), to team for production of the first four VIRGINIA Class Submarines. Under the teaming agreement, GDEB remained the design yard for the VIRGINIA Class Submarine and HII-NNS became a part of the IPPD process. The Program Office is managing two Multi-Year Procurement (MYP) contracts. The first is for the Block III (FY09-13) ships. The second is for the Block IV (FY14-18) ships awarded April 2014. All Block I & II ships (SSNs 774-783) have been delivered. The first seven Block III ships, SSN 784-790, have delivered, with one remaining ship under construction. Ten Block IV ships are awarded and under construction. The program is currently negotiating the fourth MYP (Block V) contract that will include 10 SSNs (FY19-23) and will incorporate acoustic superiority modifications on all SSNs and VPM on seven SSNs with an option to award a third SSN in FY20, FY22 and FY23. The third FY20 SSN was added during the PB2020 cycle however, due to the late add with no benefit of Advance Procurement or Economic Order Quantity funding in prior years, it will reflect a construction schedule more in line with an FY23 SSN. This contract is anticipated to award in second quarter FY2019.

**E. Performance Metrics**

Preliminary Design Review
Critical Design Review

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604580N / *(U)Virginia Payload Module (VPM)* | Project (Number/Name)<br>4500 / *VIRGINIA Payload Module* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component Development | WR | NSWC : Carderock, MD | 48.766 | 2.246 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 15.815 | 66.827 | - |
| Component Development | WR | NUWC : Newport, RI | 28.781 | 1.853 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 20.538 | 51.172 | - |
| Component Development | C/CPFF | Electric Boat : Groton, CT | 320.722 | 60.812 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 132.370 | 513.904 | - |
| Component Development | C/CPFF | GD-AIS : Pittsfield, MA | 18.600 | 4.975 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 23.575 | - |
| Component Development | WR | PMA 280/281 : Pax River, MD | 2.700 | 0.000 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.700 | - |
| Component Development | SS/CPFF | ARL/PSU : UNIVERSITY PARK, PA | 0.200 | 0.000 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| Component Development | WR | NSWC : Philadelphia, PA | 0.000 | 0.287 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.287 | - |
| Component Development | C/CPFF | Raytheon : Tuscon, AZ | 0.000 | 0.406 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.406 | - |
| | | **Subtotal** | 419.769 | 70.579 | | 0.000 | | 0.000 | | - | | 0.000 | 168.723 | 659.071 | N/A |

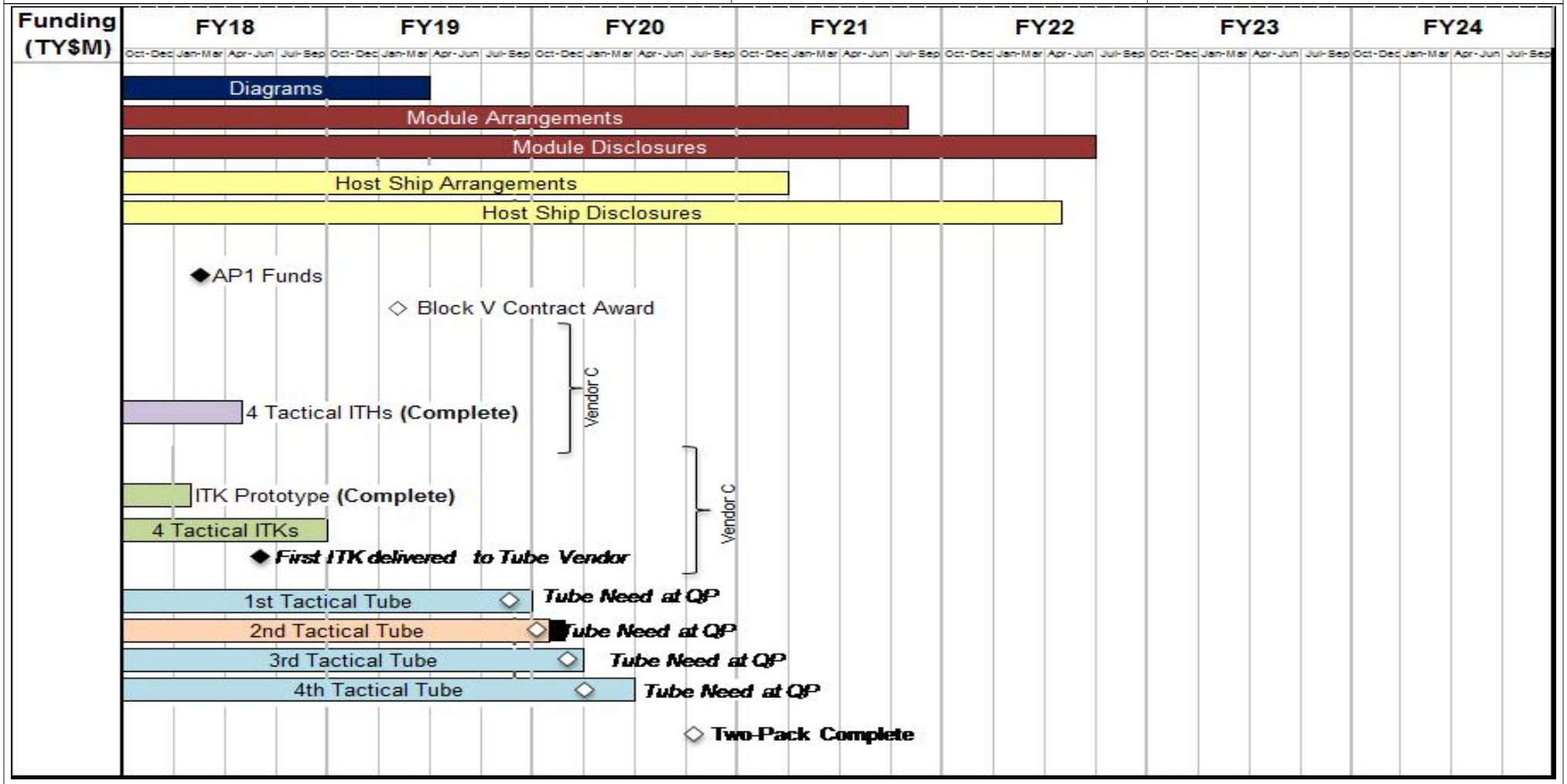
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | C/CPAF | SEAPORT : Rockville, MD | 0.750 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.500 | 1.250 | - |
| | | **Subtotal** | 0.750 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.500 | 1.250 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 420.519 | 70.579 | | 0.000 | | 0.000 | | - | | 0.000 | 169.223 | 660.321 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604580N / *(U)Virginia Payload Module (VPM)* | **Project (Number/Name)**<br>4500 / *VIRGINIA Payload Module* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604580N / *(U)Virginia Payload Module (VPM)* | **Project (Number/Name)**<br>4500 / *VIRGINIA Payload Module* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 4500*** | | | | |
| Diagrams | 1 | 2018 | 2 | 2019 |
| Module Arrangements | 1 | 2018 | 4 | 2021 |
| Module Design Development | 1 | 2018 | 3 | 2022 |
| Host Ship Arrangements | 1 | 2018 | 1 | 2021 |
| Host Ship Disclosures | 1 | 2018 | 3 | 2022 |
| Block V Contract Award | 2 | 2019 | 2 | 2019 |
| Vendor C 4 Tactical ITHs | 1 | 2018 | 3 | 2018 |
| Vendor C ITK Prototype | 1 | 2018 | 2 | 2018 |
| Vendor C 4 Tactical ITKs | 1 | 2018 | 1 | 2019 |
| 1st Tactical Tube | 1 | 2018 | 4 | 2019 |
| 2nd Tactical Tube | 1 | 2018 | 1 | 2020 |
| 3rd Tactical Tube | 1 | 2018 | 1 | 2020 |
| 4th Tactical Tube | 1 | 2018 | 2 | 2020 |
| Two-Pack Complete | 4 | 2020 | 4 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604601N *I Mine Development* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 210.716 | 24.640 | 21.747 | 28.964 | - | 28.964 | 54.300 | 49.668 | 48.442 | 43.585 | Continuing | Continuing |
| 0267: *Mine Improvements* | 210.716 | 16.933 | 18.401 | 14.160 | - | 14.160 | 19.703 | 10.763 | 10.152 | 10.355 | Continuing | Continuing |
| 2993: *Encapsulated Effector* | 0.000 | 7.707 | 3.346 | 14.804 | - | 14.804 | 34.597 | 38.905 | 38.290 | 33.230 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This program element provides resources to develop naval mine systems used to establish and maintain control of essential sea areas. Naval mines are used to deny sea area or inflict damage on adversary shipping to hinder, disrupt, and deny adversary operations. Naval mining is employed to reduce the adversary's threat to friendly forces and preserve access. Mining complements and performs an essential part of other warfare areas; particularly strike, anti-submarine, and anti-surface warfare.

Resources are utilized for developing and deploying improvements to target detection of modern threat vessels, reconfiguring and improving existing mine hardware for delivery from safe standoff distances, including integration with unmanned systems, adding a capability for networked command and control of deployed minefields, updating minefield planning tools to enable required operational timelines, and developing a wide area of coverage mine system capable of operating in intermediate and deep water depths. Core capabilities enabled include forward presence, deterrence, sea control, power projection, and maritime security to maintain freedom of the seas.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 25.635 | 25.756 | 22.021 | - | 22.021 |
| Current President's Budget | 24.640 | 21.747 | 28.964 | - | 28.964 |
| Total Adjustments | -0.995 | -4.009 | 6.943 | - | 6.943 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -4.009 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.995 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 6.943 | - | 6.943 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

FY18: -$0.995M total adjustment (SBIR reduction): -$222K for Quickstrike; -$462K for Clandestine Delivered Mines; -$311K for Encapsulated Effector
FY19: -$4.009M Congressional reduction for Encapsulated Effector Delayed New Start

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604601N *I Mine Development* |

FY20: $6.943M total adjustment: +$9.493M programmatic adjustment for Encapsulated Effector to support system development and integration efforts; -$2.550M total adjustment for Mines Improvement to account for the availability of prior year execution balances; -$1.0M for Quickstrike, -$1.55M for Clandestine Delievered Mines.

The FY 2020 funding request was reduced by $2.550 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604601N / *Mine Development* | Project (Number/Name)<br>0267 / *Mine Improvements* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0267: *Mine Improvements* | 210.716 | 16.933 | 18.401 | 14.160 | - | 14.160 | 19.703 | 10.763 | 10.152 | 10.355 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Naval mines are used to deter or control adversary movements, including surface ships and submarines. Mine Improvements R&D supports the capability to maintain effectiveness of mines facing new threat targets with increasing emphasis on major regional conflicts and littoral warfare in shallow water. The funding supports four major project areas.

1) Quickstrike Mod 3 improves effectiveness of existing Quickstrike mines against modern threats by using a programmable Target Detection Device (TDD) Mk 71. Quickstrike Mod 3 utilizes modeling and analysis to improve target detection and response by developing optimized mine settings and firing algorithms.

2) Aerial delivery improvements support capabilities required by a Joint Emergent Operational Needs Statement (JEONS). This includes adding GPS-guided, modular flight gear to the Quickstrike series to reduce risk to delivery aircraft by introducing precision placement and standoff range.

3) Clandestine Delivered Mine (CDM) provides a capability required by the JEON PC-0012 which will convert legacy mining systems for delivery by Extra Large Unmanned Undersea Vehicles (XLUUV). This capability allows access to contested environments and reduces risk by using unmanned platforms. Pre-planned product improvements to CDM incorporates the programmable TDD Mk 71 and adds remote command and control functions for increased operational flexibility and safety for emplaced minefields.

4) Minefield planning improvements include incorporation of new targeting algorithms, mine settings, and corresponding damage data for weapon/target pairs into existing minefield planning software. Also included is the development of upgrades to the software tool to allow optimization of minefield planning to account for new precision placement capabilities inherent to the JDAM-guided Quickstrike and CDM mines described above.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 11.762 | 12.668 | 9.860 | 0.000 | 9.860 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Quickstrike Mines: Continue generating operational data, based on updated fleet priority targets, for following target detection algorithms: fast patrol boat, diesel electric submarines, and large ship algorithms. Develop ruggedized flight gear interfaces to be compatible with GPS-guidance kits and high speed water impacts. Perform safety analysis of proposed design changes to mitigate hazards. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>0267 / *Mine Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| CDM: Integrate the programmable Target Detection Device Mk 71 into CDM as a product improvement. Develop initial remote control architecture for CDM, including underwater networking between mines, modifies commercial communications equipment to optimize reliability and range, while minimizing probability of detection by adversaries. Develop preliminary design of an updated fuze design to allow for remote arming and disarming functions. Perform safety analysis of proposed design changes to mitigate hazards.<br>***FY 2020 Base Plans:***<br>Quickstrike: Continue generating operational data, based on updated fleet priority targets, for following target detection algorithms: fast patrol boat, diesel electric submarines, and large ship algorithms. Conduct assessment of flight gear upgrades to ensure weapon survivability and suitability for intended mining missions. CDM: Continue development of CDM incremental improvements, including completing design of an updated fuze to allow for remote arming and disarming functions. Continue development of networked communications to improve system resiliency and security. Conduct system safety assessment and analysis to mitigate hazards in order to obtain concurrence by safety approval authorities.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY20 funding request was reduced to account for the availability of prior year execution balances. In addition, FY20 funding decreased due to fielding of Fast Patrol Boat and Capital Ship algorithms for Quickstrike Mod 3 as well as completion of development efforts for CDM Increment 1. | | | | | |
| ***Title:*** Support | 0.085 | 0.090 | 0.095 | 0.000 | 0.095 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Maintain cyber security posture and provide technical support of Mine Warfare development lab. Begin cyber security analysis and documentation in support of the remote control of the Clandestine Delivered Mine.<br>***FY 2020 Base Plans:***<br>Maintain cyber security posture and provide technical support of Mine Warfare development lab. Continue cyber security analysis and documentation in support of the remote control of the Clandestine Delivered Mine.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>0267 / *Mine Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| No significant changes. | | | | | |
| ***Title:*** Test and Evaluation | 5.006 | 5.558 | 4.115 | 0.000 | 4.115 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Quickstrike: Support JEONS capability development by testing Quickstrike configuration with JDAM equipped tail section, including interface reliability testing and aircraft integration testing. Support testing of a developmental wing kit accessory to increase delivery range of Quickstrike mines.<br>CDM: Conduct laboratory integration testing and in-water test of CDM to evaluate interfaces with delivery vehicle, proper deployment and safe arming sequence. Conduct end-to-end testing of CDM phase I during an in-water event that demonstrates weapon build-up, loading, transit, delivery, arming sequence, target detection, and simulated fire. Complete safety qualification testing of fuze and battery components of CDM. Conduct in-water demonstration of remote control of CDM prototypes with programmable target detection device Mk 71. Conduct laboratory testing improved fuzing design which enables reversible arming and disarming.<br>***FY 2020 Base Plans:***<br>Quickstrike: Finish aircraft certification of F/A-18 E/F. Conduct explosive ordnance disposal (EOD) render safe procedures testing to ensure safe disposal procedures are safe and effective for EOD forces for Mk 62 and Mk 63 variants of Quickstrike Mod 3.<br>CDM: Initiate safety qualification testing of updated fuze and battery components of CDM Increment 2. Conduct functional and reliability testing of engineering design model of reversible fuze design for use with CDM.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to completion of flight testing of JDAM-equipped configurations. Also, CDM Increment 1 testing will<br>complete in FY19. | | | | | |
| ***Title:*** Management: | 0.080 | 0.085 | 0.090 | 0.000 | 0.090 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Program management support, contract support and travel.<br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>0267 / *Mine Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Program management support, contract support and travel.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No significant changes. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 16.933 | 18.401 | 14.160 | 0.000 | 14.160 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN 3231: *Quickstrike Mine* | 6.337 | 9.758 | 5.183 | - | 5.183 | 5.289 | 8.585 | 8.793 | 24.023 | 0.000 | 130.851 |

**Remarks**

**D. Acquisition Strategy**

Procurement of Target Detecting Device (TDD) Mk 71, MK 62/63 kits, MK 65, Clandestine Delivered Mine (CDM) kits and associated components.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604601N / *Mine Development* | Project (Number/Name)<br>0267 / *Mine Improvements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NSWC PC : Panama City, FL | 117.357 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 117.357 | - |
| Ancillary Hardware Development | C/CPAF | Various : Various | 4.112 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.112 | - |
| Software Development | WR | NSWC, PC : Panama City, FL | 22.685 | 1.828 | Oct 2017 | 2.091 | Oct 2018 | 1.157 | Oct 2019 | - | | 1.157 | 0.000 | 27.761 | - |
| Clandestine Mine | WR | NSWC, PC : Panama City, FL | 6.700 | 3.233 | Oct 2017 | 2.847 | Oct 2018 | 2.101 | Oct 2019 | - | | 2.101 | 0.000 | 14.881 | - |
| Clandestine Mine | WR | NSWC, IH : Indian Head, MD | 7.475 | 4.533 | Oct 2017 | 5.750 | Oct 2018 | 4.542 | Oct 2019 | - | | 4.542 | 0.000 | 22.300 | - |
| Clandestine Mine | C/CPFF | JHU/APL : Baltimore, MD | 7.001 | 2.168 | Jul 2018 | 1.980 | Nov 2018 | 2.060 | Nov 2019 | - | | 2.060 | 0.000 | 13.209 | - |
| Quickstrike JDAM | WR | NSWC PC : Panama City, FL | 1.628 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.628 | - |
| Quickstrike JDAM | WR | NSWC IH : Indian Head, MD | 1.647 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.647 | - |
| | | **Subtotal** | 168.605 | 11.762 | | 12.668 | | 9.860 | | - | | 9.860 | 0.000 | 202.895 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA/ILS/Technical | WR | NSWC PC : Panama City, FL | 0.932 | 0.085 | Nov 2017 | 0.090 | Oct 2018 | 0.095 | Oct 2019 | - | | 0.095 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.932 | 0.085 | | 0.090 | | 0.095 | | - | | 0.095 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | NSWC PC : Panama City, FL | 0.000 | 5.006 | Oct 2017 | 3.715 | Oct 2018 | 3.032 | Oct 2019 | - | | 3.032 | 0.000 | 11.753 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604601N / *Mine Development* | Project (Number/Name)<br>0267 / *Mine Improvements* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft interface & survivability testing | WR | NSWC PC : Panama City, FL | 4.065 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.065 | - |
| Development Test & Evaluation | WR | NSWC IH : Indian Head, MD | 0.000 | 0.000 | Oct 2017 | 1.843 | Oct 2018 | 1.083 | Oct 2019 | - | | 1.083 | 0.000 | 2.926 | - |
| | | **Subtotal** | 4.065 | 5.006 | | 5.558 | | 4.115 | | - | | 4.115 | 0.000 | 18.744 | N/A |

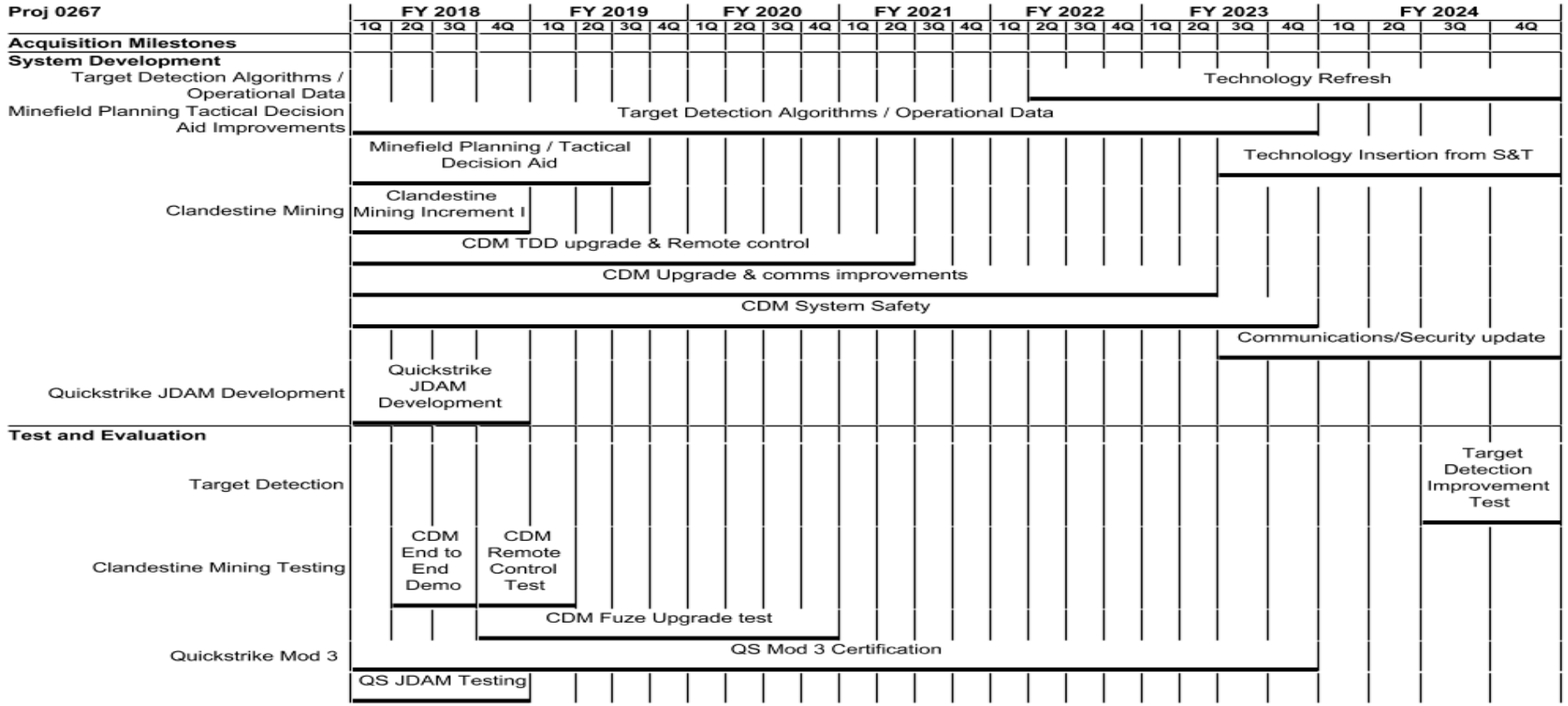
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | C/CPAF | Various : Various | 36.302 | 0.050 | Oct 2017 | 0.055 | Oct 2018 | 0.060 | Oct 2019 | - | | 0.060 | 0.000 | 36.467 | - |
| Program Management Support | C/CPAF | Various : Various | 0.728 | 0.020 | Oct 2017 | 0.020 | Oct 2018 | 0.020 | Oct 2019 | - | | 0.020 | Continuing | Continuing | Continuing |
| Travel | Various | NAVSEA : Washington DC | 0.084 | 0.010 | Oct 2017 | 0.010 | Oct 2018 | 0.010 | Oct 2019 | - | | 0.010 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 37.114 | 0.080 | | 0.085 | | 0.090 | | - | | 0.090 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 210.716 | 16.933 | | 18.401 | | 14.160 | | - | | 14.160 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>0267 / *Mine Improvements* |




*2020DON - 0604601N - 0267*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>0267 / *Mine Improvements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0267*** | | | | |
| System Development: Target Detection Algorithms / Operational Data: Technology Refresh | 2 | 2022 | 4 | 2024 |
| System Development: Minefield Planning Tactical Decision Aid Improvements: Target Detection Algorithms / Operational Data | 1 | 2018 | 4 | 2023 |
| System Development: Minefield Planning Tactical Decision Aid Improvements: Minefield Planning / Tactical Decision Aid | 1 | 2018 | 3 | 2019 |
| System Development: Minefield Planning Tactical Decision Aid Improvements: Technology Insertion from S&T | 3 | 2023 | 4 | 2024 |
| System Development: Clandestine Mining: Increment I | 1 | 2018 | 4 | 2018 |
| System Development: Clandestine Mining: TDD upgrade & Remote control | 1 | 2018 | 2 | 2021 |
| System Development: Clandestine Mining: Fuze upgrade & comms improvement | 1 | 2018 | 2 | 2023 |
| System Development: Clandestine Mining: System Safety | 1 | 2018 | 4 | 2023 |
| System Development: Clandestine Mining: Communications/Security update | 3 | 2023 | 4 | 2024 |
| System Development: Quickstrike JDAM Development: Quickstrike JDAM Development | 1 | 2018 | 4 | 2018 |
| Test and Evaluation: Target Detection: Target Detection Improvement Test | 3 | 2024 | 4 | 2024 |
| Test and Evaluation: Clandestine Mining Testing: End to End Demo | 2 | 2018 | 3 | 2018 |
| Test and Evaluation: Clandestine Mining Testing: Remote Control Test | 4 | 2018 | 1 | 2019 |
| Test and Evaluation: Clandestine Mining Testing: Fuze Upgrade Test | 4 | 2018 | 4 | 2020 |
| Test and Evaluation: Quickstrike Mod 3: QS Mod 3 Certification | 1 | 2018 | 4 | 2023 |
| Test and Evaluation: Quickstrike Mod 3: QS JDAM Testing | 1 | 2018 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604601N / *Mine Development* | | | | Project (Number/Name)<br>2993 / *Encapsulated Effector* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2993: *Encapsulated Effector* | 0.000 | 7.707 | 3.346 | 14.804 | - | 14.804 | 34.597 | 38.905 | 38.290 | 33.230 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Beginning in FY18, the Encapsulated Effector transitions technology developed by the Advanced Undersea Weapon System (AUWS) to enable capability. The program provides maritime mining capability in deeper water depths compared to existing bottom mines. Encapsulated Effector uses existing kinetic payloads to engage enemy targets, and provides a wide area of coverage per each weapon. The program uses a weapon which is self-contained and is released when a target is detected and uses mobility to engage the target. The system uses modern sensing and processing technology to enable accurate targeting at increased range, incorporates remote control to allow operational flexibility to activate/deactivate and/or change targeting parameters, and maintains minefield resilience even as weapons are expended against targets. The result is expanded operating areas to restrict or deny adversary access to the intended area while using fewer weapons than traditional mines.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 7.542 | 3.269 | 13.680 | 0.000 | 13.680 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct performance analysis and trade studies to develop a system level performance specification to support contract award in FY20. Conduct system functional review and performance requirements review. Finalize SEP and TEMP documents to guide engineering planning. Define subsystem interfaces and develop interface control document between primary hardware components and selected weapon. Conduct preliminary hazard assessment of system architecture. | | | | | |
| ***FY 2020 Base Plans:***<br>Award contract for lead systems design, integration, and testing. Conduct rapid prototyping and modeling and simulation to inform design decisions. Develop preliminary system design. Initiate pre-planned product improvement to increase lethality, expand target sets, and optimize system performance over baseline capability. Conduct system safety analysis to mitigate hazards. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>2993 / *Encapsulated Effector* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increased funding supports the 3QFY20 award for Encapsulated Effector system development and integration, thereby ramping up design and development efforts. Funding increase also supports increased requirements for additional targeting capabilities. | | | | | |
| ***Title:*** Support | 0.085 | 0.041 | 0.180 | 0.000 | 0.180 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue cyber security analysis and documentation in support of the remote control of the Encapsulated Effector. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue cyber security analysis and documentation in support of the remote control of the Encapsulated Effector. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increased funding supports anticipated level of effort required for cyber security as system matures. | | | | | |
| ***Title:*** Management: | 0.080 | 0.036 | 0.170 | 0.000 | 0.170 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Program Management Support, contract support and travel. | | | | | |
| ***FY 2020 Base Plans:***<br>Program Management Support, contract support and travel. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase corresponds to anticipated level of effort required to manage parallel development efforts of incremental improvements. | | | | | |
| ***Title:*** Test and Evaluation | 0.000 | 0.000 | 0.774 | 0.000 | 0.774 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>2993 / *Encapsulated Effector* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 Base Plans:***<br>Conduct risk-reduction testing of sensor prototypes and key system interfaces. Conduct modeling and simulation of weapon performance.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increased funding supports the execution of risk-reduction testing of sensor prototypes and key system interfaces as well as conducting modeling and simulation of weapon performance. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.707 | 3.346 | 14.804 | 0.000 | 14.804 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The Encapsulated Effector plans to leverage Navy warfare center expertise to perform requirements analysis and engineering architecture design to identify mature technologies to meet the operational objectives. Those engineering products will be provided to a prime contractor for final system integration and testing. The contractor will be responsible for the final design to optimize producibility, manufacture engineering design models to be used during testing, and test planning and execution to gather the required data to support a production decision.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604601N / *Mine Development* | Project (Number/Name)<br>2993 / *Encapsulated Effector* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NSWC PC : Panama City, FL | 0.000 | 5.988 | May 2018 | 1.855 | Oct 2018 | 2.574 | Oct 2019 | - | | 2.574 | Continuing | Continuing | Continuing |
| Weapon Interfaces & Modifications | WR | NUWC NPT : Newport, RI | 0.000 | 0.942 | Oct 2018 | 0.800 | Oct 2018 | 3.661 | Oct 2019 | - | | 3.661 | Continuing | Continuing | Continuing |
| System Safety | WR | NSWC IHEODTD : Indian Head, MD | 0.000 | 0.612 | Jun 2018 | 0.312 | Dec 2018 | 0.573 | Oct 2019 | - | | 0.573 | Continuing | Continuing | Continuing |
| Communication & Sensing | C/CPFF | JHU/APL : Baltimore, MD | 0.000 | 0.000 | | 0.302 | Nov 2018 | 0.531 | Nov 2019 | - | | 0.531 | Continuing | Continuing | Continuing |
| System Development and Integration | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 6.341 | Apr 2020 | - | | 6.341 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 7.542 | | 3.269 | | 13.680 | | - | | 13.680 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cyber / Tech support | WR | NSWC PC : Panama City, FL | 0.000 | 0.085 | May 2018 | 0.041 | Nov 2018 | 0.180 | Oct 2019 | - | | 0.180 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.085 | | 0.041 | | 0.180 | | - | | 0.180 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Test and Evaluation | WR | NSWC PC : Panama City, FL | 0.000 | 0.000 | | 0.000 | | 0.774 | Oct 2019 | - | | 0.774 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.774 | | - | | 0.774 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604601N / *Mine Development* | Project (Number/Name)<br>2993 / *Encapsulated Effector* | |

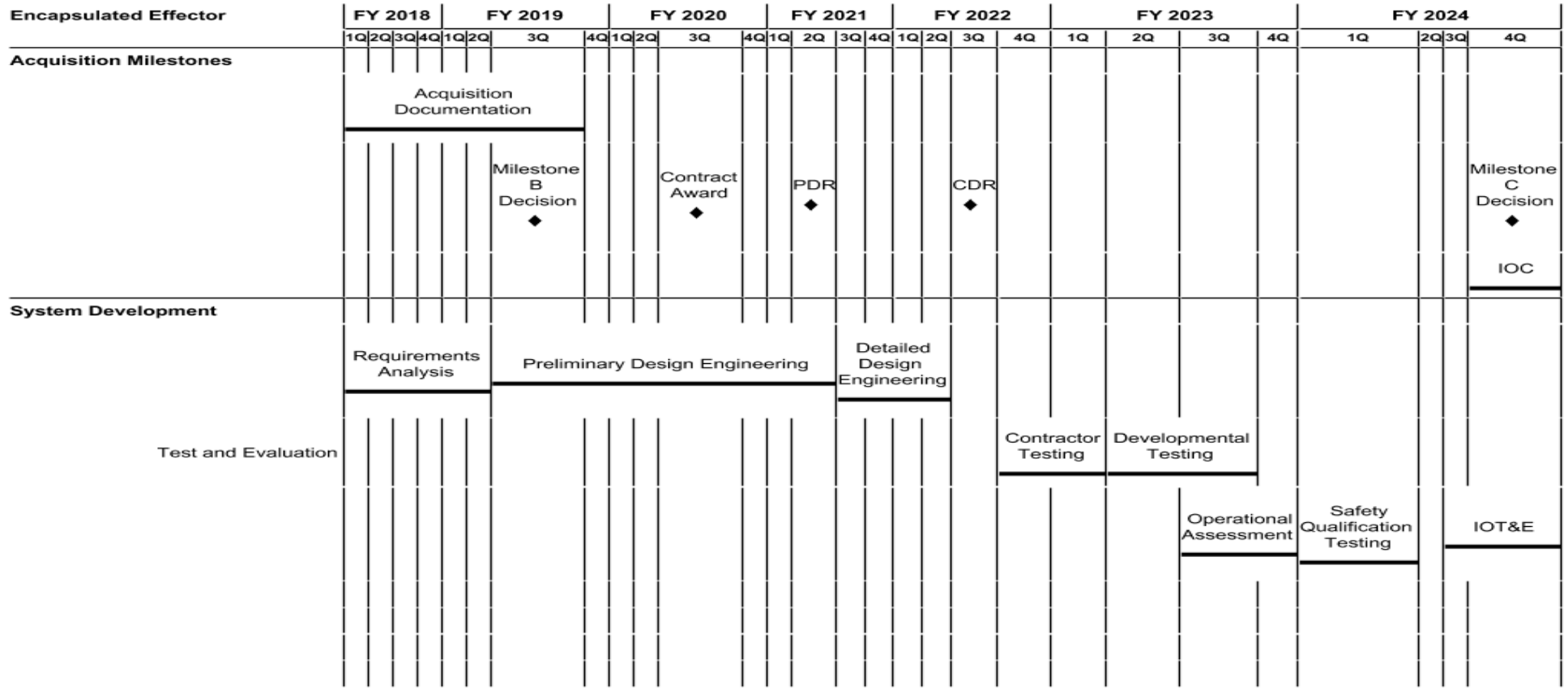
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | C/CPAF | Various : Various | 0.000 | 0.080 | Jun 2018 | 0.036 | Oct 2018 | 0.170 | Oct 2019 | - | | 0.170 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.080 | | 0.036 | | 0.170 | | - | | 0.170 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 7.707 | | 3.346 | | 14.804 | | - | | 14.804 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>2993 / *Encapsulated Effector* |




*2020DON - 0604601N - 2993*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604601N / *Mine Development* | **Project (Number/Name)**<br>2993 / *Encapsulated Effector* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Encapsulated Effector*** | | | | |
| Acquisition Milestones: Acquisition Documentation | 1 | 2018 | 3 | 2019 |
| Acquisition Milestones: Milestone B Decision | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: Milestone C Decision | 4 | 2024 | 4 | 2024 |
| Acquisition Milestones: System Functional Review | 2 | 2019 | 2 | 2019 |
| Acquisition Milestones: Contract Award | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Preliminary Design Review | 2 | 2021 | 2 | 2021 |
| Acquisition Milestones: Critical Design Review | 3 | 2022 | 3 | 2022 |
| Acquisition Milestones: IOC | 4 | 2024 | 4 | 2024 |
| System Development: Preliminary Design Engineering | 3 | 2019 | 2 | 2021 |
| System Development: Detailed Design Engineering | 3 | 2021 | 2 | 2022 |
| System Development: Requirements Analysis | 1 | 2018 | 2 | 2019 |
| System Development: Test and Evaluation: Contractor Testing | 4 | 2022 | 1 | 2023 |
| System Development: Test and Evaluation: Developmental Testing | 2 | 2023 | 3 | 2023 |
| System Development: Test and Evaluation: Operational Assessment | 3 | 2023 | 4 | 2023 |
| System Development: Test and Evaluation: Safety Qualification Testing | 1 | 2024 | 1 | 2024 |
| System Development: Test and Evaluation: IOT&E | 3 | 2024 | 4 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604610N *I Lightweight Torpedo Development* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 345.501 | 21.057 | 63.147 | 148.349 | - | 148.349 | 145.421 | 98.060 | 65.317 | 58.728 | Continuing | Continuing |
| 1412: *HAAWC* | 0.000 | 8.516 | 3.916 | 6.754 | - | 6.754 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.186 |
| 2234: *Lightweight Hybrid Torpedo* | 345.501 | 12.541 | 22.831 | 17.798 | - | 17.798 | 16.824 | 13.938 | 14.152 | 14.427 | Continuing | Continuing |
| 3418: *Advanced Anti-Submarine Lightweight Torpedo* | 0.000 | 0.000 | 36.400 | 123.797 | - | 123.797 | 128.597 | 84.122 | 51.165 | 44.301 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

The Lightweight Torpedo (LWT) program designs, integrates and tests the LWT MK 54. The LWT development program provides performance improvements in shallow water and counter-measure environments. The High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) development and Low Rate Initial Production (LRIP) contract was awarded to Boeing on April 2013. The Advanced Lightweight Torpedo effort has completed Analysis of Alternatives (AoA) and out briefed the selected material solution. The effort is currently in the system requirements and development phase for FY 2019.

Budget supports an incremental developmental acquisition approach combining hardware and Advanced Processor Build (APB) software upgrades to enable rapid fielding of improvements to the fleet. The program will focus on common LWT and Heavyweight Torpedo (HWT) hardware and software architecture enhancements that will provide re-architecture, broadband array improvements, and APB software improvements. Future APB software builds will utilize the common torpedo software to deliver capability and tactic improvements to the MK 54 LWT. The program will also support development of enhanced weapon delivery methods, including the high altitude launch of the MK 54 from the P-8A Maritime Patrol Reconnaissance Aircraft (MPRA) with the HAAWC.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 28.076 | 95.147 | 159.755 | - | 159.755 |
| Current President's Budget | 21.057 | 63.147 | 148.349 | - | 148.349 |
| Total Adjustments | -7.019 | -32.000 | -11.406 | - | -11.406 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -32.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | -10.000 | - | -10.000 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -1.406 | - | -1.406 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604610N *I Lightweight Torpedo Development* |

| | | | | | |
|---|---|---|---|---|---|
| • Congressional Directed Reductions | -7.019 | - | - | - | - |
| Adjustments | | | | | |

**Change Summary Explanation**

Proj: 1412 HAAWC - Increase of $2.838M from FY19 to FY20 is required to support in-water test runs for Operational Testing (OT), and funds to contractor Boeing to pay for test support and planning, development close-out, and software upgrades.

Proj: 2234 Lightweight Hybrid Torpedo - Decrease of $5.033M from FY19 to FY20 based on a reduction in the number of in-water developmental test runs.

Proj: 3418 Advanced Anti-Submarine Lightweight Torpedo - Increase of $87.397M from FY19 to FY20 required for Other Transactional Authority (OTA) agreements for the development of an improved propulsion system, modified Otto Fuel engine, new warhead development, new Guidance & Control(G&C) Section, All up Round (AUR) integration, P-8A and Helo platform integration, New Fleet Exercise Section development, and New Test Set development in support of Advanced Lightweight Torpedo (MK54 MOD 2) development.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>1412 / *HAAWC* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1412: *HAAWC* | 0.000 | 8.516 | 3.916 | 6.754 | - | 6.754 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 19.186 |
| Quantity of RDT&E Articles | | 23 | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The program will design, develop, and procure a High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Air Launch Accessory (ALA) for the MK 54 Lightweight Torpedo (LWT). This capability will allow employment of the MK 54 outside the current fixed wing launch envelope. This includes the ability to employ the MK 54 LWT at high altitude, with stand-off ranges, and with the ability for precision guidance to the intended water entry point (WEP) without affecting the in-water operation of the LWT. This ALA is intended for employment with the Navy's latest Maritime Patrol and Reconnaissance Aircraft (MPRA), the P-8A Poseidon.

FY 2020 achievement of HAAWC IOC

HAAWC program was previously funded in FY 2016 - FY 2017 from Proj. 2234 Lightweight Hybrid Torpedo.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Development | 8.516 | 3.916 | 6.754 | 0.000 | 6.754 |
| ***Articles:*** | 23 | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |
| Continue Integrated Testing with P-8A Platform. | | | | | |
| Complete Operational test Readiness Review (OTRR) | | | | | |
| Begin Operational Testing (OT) | | | | | |
| Conduct System Verification Review (SVR) | | | | | |
| Conduct Flight Readiness Review (FRR) | | | | | |
| Complete Developmental Testing with P-8A Platform | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |
| Complete Operational Test (OT) | | | | | |
| Complete Cybersecurity reviews development closeout | | | | | |
| Conduct final Safety reviews | | | | | |
| Closeout Flight Simulator software and documentation | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>1412 / *HAAWC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $2.838M from FY19 to FY20 is based on additional engineering support for in-water test runs for OT and funds to contractor, Boeing, to pay for test support and planning, development close-out, and software upgrades. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.516 | 3.916 | 6.754 | 0.000 | 6.754 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN/3215: *MK54 Torpedo Mods* | 94.699 | 83.825 | 119.502 | - | 119.502 | 136.115 | 148.186 | 198.937 | 202.905 | 0.000 | 2,075.337 |

**Remarks**

**D. Acquisition Strategy**

The Engineering and Manufacturing Development (EMD) contract held by Boeing Company supports an incremental approach to delivering full HAAWC capability, Air Launch Accessory (ALA) assets and equipment, as well as associated engineering services and support. The schedule for the completion of the EMD phase of the MK 54 HAAWC AUR development is closely linked to the P-8A Increment 2 design and integration schedule. The EMD contract was awarded in April 2013, with options for the procurement of LRIP units. A future full rate production contract was evaluated through market research and Request For Information (RFIs) for competitive award. The Navy has decided after in depth evaluation, it is in the best interest of the government to award a sole source contract to Boeing. Contract award will be in FY 2020, upon successfully meeting Initial Operating Capability (IOC) requirements and conducting a Full Rate Production Decision Review.

**E. Performance Metrics**

Milestone reviews
Program Management reviews
System engineering technical review

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>1412 / *HAAWC* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development - HAAWC | C/CPFF | Boeing : St. Louis, MO | 0.000 | 5.585 | Nov 2017 | 0.000 | Dec 2018 | 0.600 | Nov 2019 | - | | 0.600 | 0.000 | 6.185 | - |
| Hardware Development - HAAWC | WR | NSWC : Indian Head, MD | 0.000 | 0.040 | Nov 2017 | 0.200 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.240 | - |
| Systems Engineering - HAAWC | WR | NSWC : Pax River, MD | 0.000 | 0.475 | Nov 2017 | 0.000 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.475 | - |
| Systems Engineering - HAAWC | WR | NAWC : China Lake, CA | 0.000 | 0.740 | Nov 2017 | 0.090 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.830 | - |
| Systems Engineering - HAAWC | WR | NUWC : Newport | 0.000 | 0.000 | | 0.340 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.340 | - |
| | | **Subtotal** | 0.000 | 6.840 | | 0.630 | | 0.600 | | - | | 0.600 | 0.000 | 8.070 | N/A |

**Remarks**

Funding required in FY20 on Boeing contract for hardware support and planning.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - HAAWC | WR | NUWC : Keyport | 0.000 | 0.000 | | 0.219 | Nov 2018 | 0.900 | Nov 2019 | - | | 0.900 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.219 | | 0.900 | | - | | 0.900 | Continuing | Continuing | N/A |

**Remarks**

Increased funding required in FY20 for HAAWC documentation and systems engineering agent support.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Test & Evaluation - HAAWC | C/CPFF | Boeing : St. Louis, MO | 0.000 | 0.000 | | 0.500 | Dec 2018 | 2.233 | Nov 2019 | - | | 2.233 | 0.000 | 2.733 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>1412 / *HAAWC* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Test & Evaluation - HAAWC | WR | NUWC : Keyport, WA | 0.000 | 0.525 | Nov 2017 | 1.260 | Nov 2018 | 0.284 | Nov 2019 | - | | 0.284 | 0.000 | 2.069 | - |
| System Test & Evaluation - HAAWC | C/BA | NUWC : Newport, RI | 0.000 | 0.751 | Nov 2017 | 0.000 | Dec 2018 | 0.637 | Nov 2019 | - | | 0.637 | 0.000 | 1.388 | - |
| System Test & Evaluation - HAAWC | WR | NAWC : China Lake, CA | 0.000 | 0.000 | | 0.560 | Nov 2018 | 0.400 | Nov 2019 | - | | 0.400 | 0.000 | 0.960 | - |
| System Test & Evaluation - HAAWC | WR | NAWC : Pax River, MD | 0.000 | 0.000 | | 0.297 | Nov 2018 | 0.700 | Nov 2019 | - | | 0.700 | 0.000 | 0.997 | - |
| System Test & Evaluation - HAAWC | WR | OPTEVFOR : Norfolk, VA | 0.000 | 0.400 | Nov 2017 | 0.450 | Dec 2018 | 1.000 | Nov 2019 | - | | 1.000 | 0.000 | 1.850 | - |
| System Test & Evaluation - HAAWC | C/BA | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 1.676 | | 3.067 | | 5.254 | | - | | 5.254 | 0.000 | 9.997 | N/A |

**Remarks**

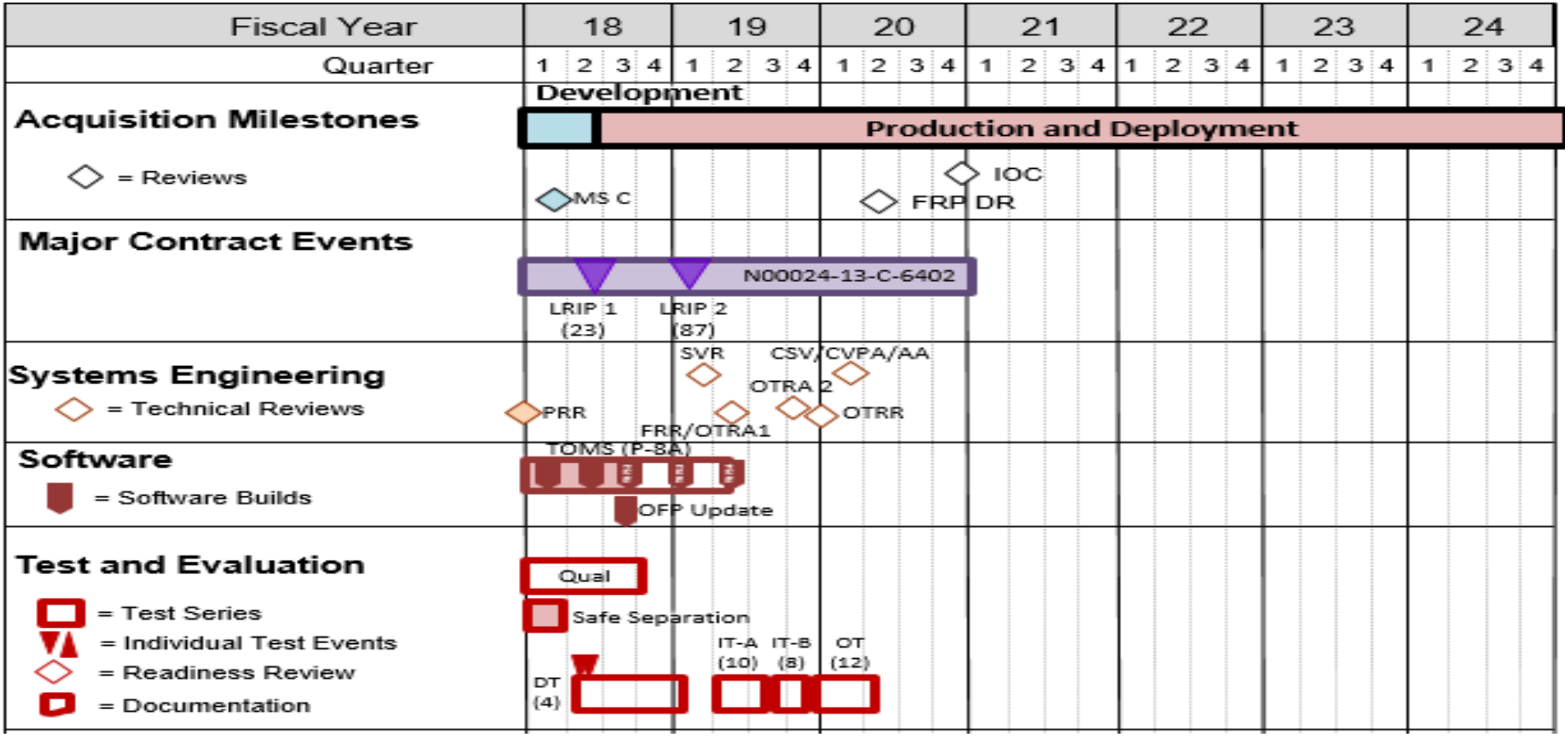
Increased funding in FY20 required to conduct Operational Testing (OT), complete final OT report, complete reviews for cyber security and safety, and closeout flight simulator software/documentation.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 8.516 | | 3.916 | | 6.754 | | - | | 6.754 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>1412 / *HAAWC* |

# HAAWC Development Schedule



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>1412 / *HAAWC* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1412*** | | | | |
| HAAWC Design/Development/Qualification: HAAWC MS C | 1 | 2018 | 1 | 2018 |
| HAAWC Design/Development/Qualification: HAAWC IT / OT | 2 | 2019 | 2 | 2020 |
| HAAWC Design/Development/Qualification: HAAWC IOC | 4 | 2020 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>2234 / *Lightweight Hybrid Torpedo* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2234: *Lightweight Hybrid Torpedo* | 345.501 | 12.541 | 22.831 | 17.798 | - | 17.798 | 16.824 | 13.938 | 14.152 | 14.427 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The program designs, integrates and tests the LWT MK54. The LWT provides performance improvements in shallow water, counter-measure environments. The MK 54 MOD 1 program consists to two increments: 1) Advanced Processor Build (APB) 5/Tech Insertion 1 (TI1) and 2) APB-6 software upgrade.

FY 2021 achievement of MK 54 MOD 1 IOC

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** MK54 Pre-Planned Product Improvement | 12.541 | 22.831 | 17.798 | 0.000 | 17.798 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct MK 54 MOD 1 IT<br>Conduct MK 54 MOD 1 Operational Test Readiness Review (OTRR)<br>Begin APB 6 (INC 2) software development | | | | | |
| ***FY 2020 Base Plans:***<br>Conduct MK54 MOD 1 Operational Testing (OT)<br>Continue Countermeasure Procurement<br>Continue Fleet Exercise Section(FES)Development<br>Continue Environmentally Centric Weapons Facility (EC WAF) Integration<br>Continue APB 6 (INC 2) software development | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $5.033M from FY19 to FY20 based on a reduction in the number of in-water operational test runs. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 12.541 | 22.831 | 17.798 | 0.000 | 17.798 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>2234 / *Lightweight Hybrid Torpedo* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN/3215: *MK54 Torpedo Mods* | 94.699 | 83.825 | 119.502 | - | 119.502 | 136.115 | 148.186 | 198.937 | 202.905 | 0.000 | 2,075.337 |

**Remarks**

**D. Acquisition Strategy**

Leveraging a Phase III SBIR, a MK 54 MOD 1 LRIP contract was awarded to Progeny in 2016, for the delivery of MOD 1 assets to support Operational Testing (OT) leading to a planned IOC in 2021. Continuing on with the SBIR contractor, a second LRIP contract was awarded to Progeny for MOD 1 kits in 2018, with an option for Full Rate Production in 2021. In conjunction with these MK 54 MOD 1 hardware procurements, APB software upgrades will provide significant torpedo performance improvements. APB 5 and APB 6 software development and testing is performed by NUWC Division Newport.

**E. Performance Metrics**

Milestone reviews
System engineering technical review

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>2234 / *Lightweight Hybrid Torpedo* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development - PRIOR YEAR | WR | NUWC : Newport/ Keyport | 47.640 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 47.640 | - |
| Hardware Development - MK 54 MOD 1 | WR | NUWC : Newport | 1.385 | 0.681 | Nov 2017 | 1.400 | Nov 2018 | 1.282 | Nov 2019 | - | | 1.282 | 0.000 | 4.748 | - |
| Hardware Development - MK 54 MOD 1 | SS/FP | Progeny Systems : Not Specified | 24.394 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.394 | - |
| Hardware Development - HAAWC | WR | NSWCCD : Carderock, MD | 0.050 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Hardware Development - HAAWC | C/CPAF | Boeing : St. Louis, MO | 98.216 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 98.216 | - |
| Hardware Development - HAAWC | WR | NSWCDD : Dahlgren, VA | 0.400 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| Hardware Development - HAAWC | WR | NSWC : Indian Head | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Hardware Development - INSENSITIVE MUNITIONS | WR | NUWC : Newport | 0.420 | 0.110 | Oct 2017 | 0.210 | Jan 2019 | 0.210 | Nov 2019 | - | | 0.210 | Continuing | Continuing | Continuing |
| Hardware Development - INSENSITIVE MUNITIONS | WR | NSWC : Indian Head, MD | 0.480 | 0.150 | Jan 2018 | 0.150 | Jan 2019 | 0.150 | Nov 2019 | - | | 0.150 | Continuing | Continuing | Continuing |
| Hardware Development - INSENSITIVE MUNITIONS | WR | NUWC : Keyport | 0.000 | 0.122 | Nov 2017 | 0.196 | Jan 2019 | 0.101 | Nov 2019 | - | | 0.101 | Continuing | Continuing | Continuing |
| Hardware Development - MK54 MOD 1 | WR | NSWC : Indian Head, MD | 5.030 | 1.920 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.950 | - |
| Software Development - PRIOR YEAR | WR | NUWC : Newport/ Keyport | 20.454 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.454 | - |
| Software Development - MK 54 MOD 1 | WR | NUWC : Newport | 0.010 | 0.000 | Oct 2017 | 0.075 | Nov 2018 | 0.580 | Nov 2019 | - | | 0.580 | 0.000 | 0.665 | - |
| Software Development - MK 54 MOD 1 | MIPR | MIT : Boston, MA | 1.358 | 0.000 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.358 | - |
| Software Development - MK 54 MOD 1 | C/BA | ARL/PSU : Philadephia, PA | 0.621 | 0.820 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.441 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>2234 / *Lightweight Hybrid Torpedo* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - VLA | SS/FP | Lockheed Martin: VLA : Akron, OH | 7.606 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.606 | - |
| Systems Engineering - HAAWC | WR | NSWC PMA 290 : Patuxent, MD | 9.582 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.582 | - |
| Systems Engineering - HAAWC | WR | NAWCWD : China Lake | 6.606 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.606 | - |
| Systems Enginnering - HAAWC | C/CPFF | John Hopkins University : Baltimore, MD | 0.050 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| System Test & Evaluation - HAAWC | WR | NUWC : Newport/ Keyport | 21.931 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 21.931 | - |
| Hardware Development - ADV LWT | WR | NUWC : Newport | 0.000 | 1.218 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.218 | - |
| Hardware Development - ADV LWT | WR | NUWC : Keyport | 0.000 | 0.300 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| Hardware Development - ADV LWT | WR | NSWC : Indian Head, MD | 0.000 | 0.270 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.270 | - |
| Software Development - APB 6 | WR | NUWC : Newport | 0.000 | 0.000 | | 0.395 | Dec 2018 | 0.403 | Nov 2019 | - | | 0.403 | 0.000 | 0.798 | - |
| Software Development - FCT program | C/BA | NUWC : Newport/ Keyport | 0.000 | 1.150 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.150 | - |
| Hardware Development - ADV LWT | WR | NAVSEA : Washington, DC | 0.000 | 0.025 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.025 | - |
| Hardware Development - ADV LWT | WR | NAVAIR : Pax River, MD | 0.000 | 0.025 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.025 | - |
| | | **Subtotal** | 246.233 | 6.791 | | 2.426 | | 2.726 | | - | | 2.726 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>2234 / *Lightweight Hybrid Torpedo* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development | WR | NUWC : Newport/ Keyport | 5.347 | 0.185 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.532 | - |
| Program Management Support | WR | NUWC : Newport/ Keyport | 8.805 | 0.468 | Dec 2017 | 1.672 | Nov 2018 | 1.193 | Nov 2019 | - | | 1.193 | 0.000 | 12.138 | - |
| Program Management Support | C/BA | ARL/PSU : Philadephia, PA | 0.441 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.441 | - |
| Program Management Support | Various | NAVSEA : Not Specified | 0.168 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.168 | - |
| Systems Engineering | WR | NUWC : Newport/ Keyport | 0.120 | 0.000 | | 0.235 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.355 | - |
| System Test and Evaluation | WR | NUWC : Newport/ Keyport | 30.293 | 0.000 | Nov 2017 | 0.565 | Nov 2018 | 0.428 | Nov 2019 | - | | 0.428 | 0.000 | 31.286 | - |
| Hardware Development | WR | NSWC : Indian Head, MD | 0.000 | 0.000 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Program Management Support | WR | NSWC : Indian Head, MD | 0.000 | 0.000 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 45.174 | 0.653 | | 2.472 | | 1.621 | | - | | 1.621 | 0.000 | 49.920 | N/A |

**Remarks**

Decreased support funding required in FY20 based on reduced number of in-water developmental test runs.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering - MK 54 MOD 1 | WR | NSWC : Carderock | 1.259 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.259 | - |
| System Test and Evaluation - PRIOR YEAR | WR | NUWC : Newport/ Keyport | 32.191 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.191 | - |
| System Test and Evalution - MK 54 MOD 1 | WR | NUWC : Keyport | 2.454 | 0.863 | Dec 2017 | 4.242 | Jan 2019 | 4.351 | Nov 2019 | - | | 4.351 | 0.000 | 11.910 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>2234 / *Lightweight Hybrid Torpedo* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Test and Evaluation - MK 54 MOD 1 | WR | NUWC : Newport | 3.923 | 3.218 | Dec 2017 | 12.601 | Nov 2018 | 6.978 | Nov 2019 | - | | 6.978 | 0.000 | 26.720 | - |
| System Test and Evaluation - MK 54 MOD 1 | WR | NSWC : Indian Head, MD | 1.576 | 0.000 | | 0.100 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | 0.000 | 1.776 | - |
| System Test and Evaluation - MK 54 MOD 1 | C/CPIF | ARL/PSU : Philadephia, PA | 0.068 | 0.000 | | 0.000 | | 0.288 | Nov 2019 | - | | 0.288 | 0.000 | 0.356 | - |
| System Test and Evaluation - MK 54 MOD 1 | WR | Aberdeen Test Center : Aberdeen, MD | 0.731 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.731 | - |
| System Test and Evaluation - MK 54 MOD 1 | WR | OPTEVFOR : Not Specified | 1.000 | 0.629 | Nov 2017 | 0.500 | Nov 2018 | 1.235 | Nov 2019 | - | | 1.235 | 0.000 | 3.364 | - |
| System Test and Evaluation - PRIOR YEAR | WR | OPTEVFOR : Not Specified | 3.490 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.490 | - |
| System Test and Evaluation - HAAWC | WR | OPTEVFOR : Not Specified | 0.750 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |
| System Test and Evaluation - HAAWC | WR | NSWC : Dalgren, VA | 0.091 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.091 | - |
| System Test and Evaluation - HAAWC | WR | NUWC : Keyport | 0.618 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.618 | - |
| System Test and Evaluation - HAAWC | WR | NUWC : Newport | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| System Test and Evaluation - WEAPON TRANSPORT | WR | NUWC : Keyport | 0.053 | 0.028 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.081 | - |
| System Test and Evaluation - ADV LWT | WR | NUWC : Newport | 0.000 | 0.000 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| System Test and Evalution - ADV LWT | WR | NUWC : Keyport | 0.000 | 0.000 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| System Test and Evaluation - ADV LWT | WR | NSWC : Indian Head, MD | 0.000 | 0.000 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| System Test and Evalution - MK54 MOD 1 | WR | NAVSEA : Washington, DC | 0.000 | 0.039 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.039 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>2234 / *Lightweight Hybrid Torpedo* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 48.204 | 4.777 | | 17.443 | | 12.952 | | - | | 12.952 | 0.000 | 83.376 | N/A |

**Remarks**

Decreased T&E funding required in FY20 based on reduced number of in-water developmental test runs.

**Management Services ($ in Millions)**

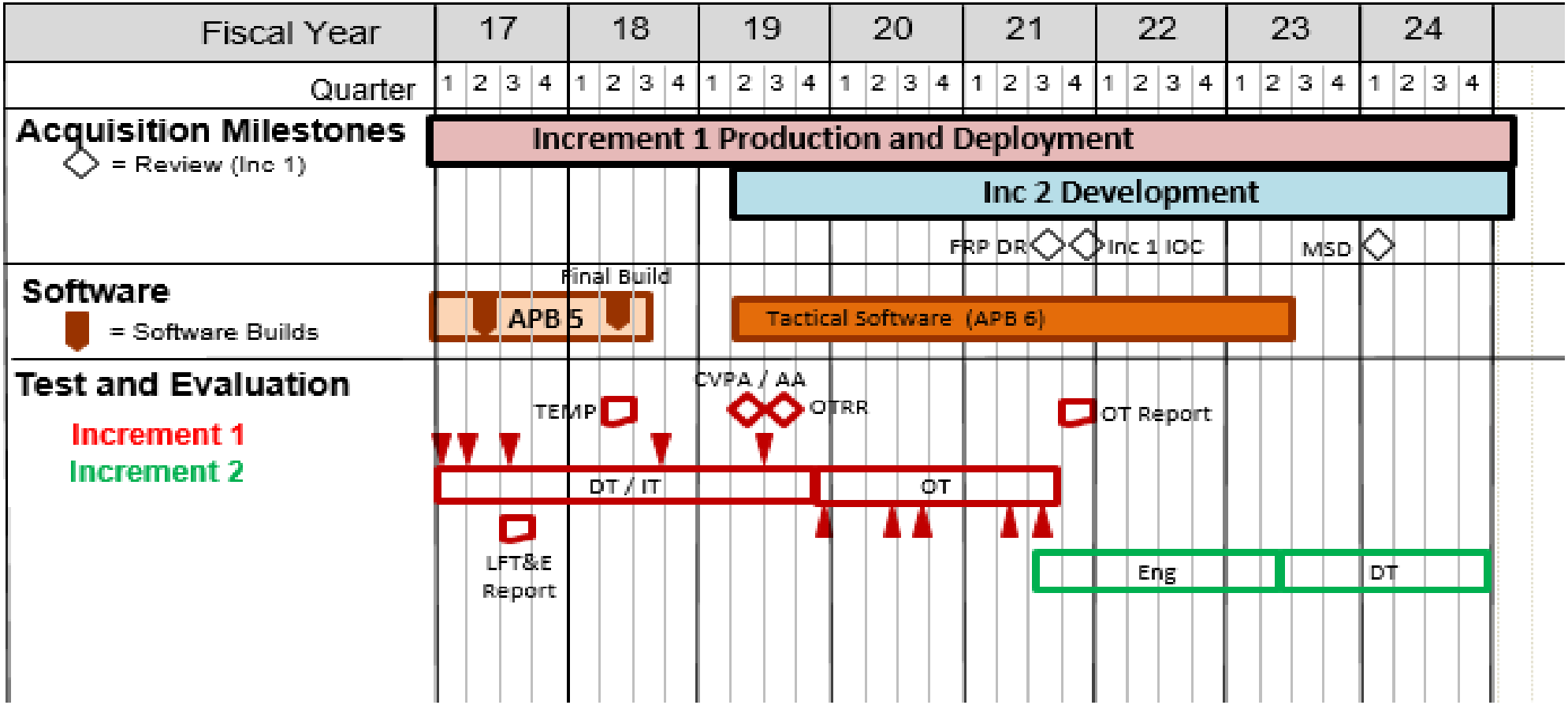
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | NAVSEA : Washington, DC | 0.487 | 0.020 | Jan 2018 | 0.028 | Feb 2019 | 0.028 | Nov 2019 | - | | 0.028 | Continuing | Continuing | Continuing |
| Program Management Support | C/FPIF | EWCSS : Washington, DC | 4.496 | 0.300 | Mar 2018 | 0.462 | Feb 2019 | 0.471 | Nov 2019 | - | | 0.471 | 0.000 | 5.729 | - |
| Program Management Support | C/CPFF | ARL/PSU : Philadephia, PA | 0.588 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.588 | - |
| Program Management Support | Various | NAVSEA : Washington, DC | 0.093 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.093 | - |
| Acquisition Workforce Fund | Various | Not Specified : Not Specified | 0.226 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.226 | - |
| | | **Subtotal** | 5.890 | 0.320 | | 0.490 | | 0.499 | | - | | 0.499 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 345.501 | 12.541 | | 22.831 | | 17.798 | | - | | 17.798 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>2234 / *Lightweight Hybrid Torpedo* |

# MK 54 MOD 1 Schedule



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>2234 / *Lightweight Hybrid Torpedo* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2234*** | | | | |
| APB 5 /TI-1: Continue APB 5 / TI-1 DT/IT | 1 | 2018 | 4 | 2019 |
| APB 5 /TI-1: APB 5 / TI-1 OT | 4 | 2019 | 3 | 2021 |
| APB 5 /TI-1: APB 5 / TI-1 IOC | 4 | 2021 | 4 | 2021 |
| Inc 2: APB 6 Tactical Software Development | 2 | 2019 | 3 | 2023 |
| Inc 2: APB 6 Development Testing (DT) | 2 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3418: *Advanced Anti-Submarine Lightweight Torpedo* | 0.000 | 0.000 | 36.400 | 123.797 | - | 123.797 | 128.597 | 84.122 | 51.165 | 44.301 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Developing an Advanced Lightweight Torpedo (ALWT) capable of prosecuting challenging adversary submarine targets. The effort has completed Analysis of Alternatives (AoA) and out briefed the selected material solution. Improvements to various hardware subsystems were evaluated for performance improvements along with software and algorithm updates. The AoA completed 4Q FY 2017. In FY 2019, the program will leverage the use of Other Transactional Authority (OTA)s for system and subsystem development strategies. FY 2019 funding will allow for more detailed design and development work (HW/SW) to commence. The FY will begin with significant system requirements and initial functional allocation work.

In FY20, the program will begin additional development of support equipment, test sets, and air launch accessories. The program will conduct additional testing and platform integration (surface and air) to further support initial system design work. Funds will be distributed on OTAs for development of Guidance and Control (G&C) subsystems, warhead modifications, modified Air Launch Accessary (ALA) wing kit, and modified afterbodies; Otto fuel and improved propulsion system. Additional funding will be provided on UARC contracts for integration support and to NUWCs for government software development and support. Subsystem prototype build and test for major subsystems is the biggest cost driver from FY19 to FY20 (materials, build process development, and test program included). Significant aircraft integration tasks begin (P-8A and MH-60R) which will include software and interface design activities. PDR is occurring in FY20 which leads to detailed system modeling with associated simulation runs, analysis and drawing preparation. This task requires assessing analysis to date and subsystem prototype performance to ensure we are moving out with the correct initial system design. Milestone B preparation will also require additional subject matter expert (SME) involvement for assessment and documentation development.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** ALWT Development | 0.000 | 36.400 | 123.797 | 0.000 | 123.797 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Award all OTAs for weapon development<br>-Conduct and closeout System Requirements Review (SRR).<br>-Begin MOD 2 APB Software Development (requirements and architecture analysis)<br>-Begin Fleet Exercise Section (FES) Development<br>-Begin Test Set (Warhead/Engine/All up Round) Development<br>-Begin Ship Integration Interface Design | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Begin Hardware Development for Warhead Section, Guidance & Control Section, and Propulsion<br>-Begin EC WAF Modeling and Simulation Accreditation<br>-Begin System Test Bed Development<br>-Conduct System Functional Review (SFR).<br><br>***FY 2020 Base Plans:***<br>-Continue MOD 2 APB Software Development (requirements and architecture analysis)<br>-Continue Fleet Exercise Section (FES) Development<br>-Continue Test Set (Warhead/Engine/All up Round) Development<br>-Continue Ship Integration Interface Design<br>-Continue Hardware Development for Warhead Section, Guidance & Control Section, and Propulsion<br>-Continue EC WAF Modeling and Simulation Accreditation<br>-Propulsion Section Prototype Build and Testing<br>-Guidance and Control (G&C) Section Prototype Build and Testing<br>-Warhead Section Prototype Build and Testing<br>-Continue System Test Bed Development<br>-Begin MH-60R/P-8A Integration Interface Design (requirements/analysis/software)<br>-Begin Air Launch Accessory (ALA) Requirements and Initial System Design<br>-Initial Software/Hardware (SW/HW) Integration<br>-Conduct Milestone B preparation documentation reviews<br>-Conduct Preliminary Design Review (PDR).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $87.397M from FY19 to FY20 required for Other Transactional Authority (OTA) agreements for the development of an improved propulsion system, modified Otto Fuel engine, new warhead development, new Guidance & Control(G&C) Section, All up Round (AUR) integration, P-8A and Helo platform integration, new Fleet Exercise Section (FES) development, and New Test Set development in support of Advanced Lightweight Torpedo (MK54 MOD 2) development. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 36.400 | 123.797 | 0.000 | 123.797 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN/3215: *MK-54 Torpedo Mods* | 94.699 | 83.825 | 119.502 | - | 119.502 | 136.115 | 148.186 | 198.937 | 202.905 | 0.000 | 2,075.337 |

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy is to use University Affiliated Research Centers (UARCs), Warfare Centers, and competitive Other Transactional Authority (OTA) agreements with industry to prototype a new Advanced Lightweight Torpedo that will be production ready in FY23. The program will then pursue accelerated acquisition LRIP opportunities while preparing for full and open FRP competition. This accelerated approach requires full initial funding to ensure all prototyping efforts deliver a fully integrated and production-ready weapon. Scope of effort includes weapon, launch platform integration, and all associated subsystems and supporting capabilities.

**E. Performance Metrics**

Milestone reviews
System engineering technical review

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | WR | NUWC NPT : Newport, RI | 0.000 | 0.000 | | 3.297 | Dec 2018 | 3.500 | Nov 2019 | - | | 3.500 | 0.000 | 6.797 | - |
| Software Development | C/CPFF | Carnegie Mellon : Pittsburgh, PA | 0.000 | 0.000 | | 0.400 | Jan 2019 | 0.400 | Nov 2019 | - | | 0.400 | 0.000 | 0.800 | - |
| Hardware Development | WR | NUWC NPT : Newport, RI | 0.000 | 0.000 | | 1.800 | Dec 2018 | 0.850 | Nov 2019 | - | | 0.850 | Continuing | Continuing | Continuing |
| Hardware Development | WR | NUWC KPT : Keyport, WA | 0.000 | 0.000 | | 0.350 | Dec 2018 | 0.500 | Nov 2019 | - | | 0.500 | 0.000 | 0.850 | - |
| Hardware Development | WR | NSWC, IH : Indian Head, MD | 0.000 | 0.000 | | 0.900 | Dec 2018 | 0.900 | Nov 2019 | - | | 0.900 | 0.000 | 1.800 | - |
| Hardware Development - AUR | C/CPFF | ARL/PSU : State College, PA | 0.000 | 0.000 | | 4.500 | Jan 2019 | 7.150 | Nov 2019 | - | | 7.150 | 0.000 | 11.650 | - |
| Hardware Development | WR | PEO-IWS : Washington, DC | 0.000 | 0.000 | | 4.650 | May 2019 | 4.000 | Nov 2019 | - | | 4.000 | 0.000 | 8.650 | - |
| Hardware Development | WR | NAVAIR : Pax River, MD | 0.000 | 0.000 | | 0.250 | Dec 2018 | 16.450 | Nov 2019 | - | | 16.450 | 0.000 | 16.700 | - |
| Hardware Development - G&C | C/CPIF | OTA - Progeny : Manassas, VA | 0.000 | 0.000 | | 1.800 | Mar 2019 | 6.000 | Jan 2020 | - | | 6.000 | 0.000 | 7.800 | - |
| Hardware Development - New engine | C/CPIF | OTA - Aerojet Rocketdyne : Huntsville, AL | 0.000 | 0.000 | | 7.600 | Mar 2019 | 26.900 | Jan 2020 | - | | 26.900 | 0.000 | 34.500 | - |
| Hardware Development - Otto Fuel | C/CPIF | OTA - Aerojet Rocketdyne : Huntsville, AL | 0.000 | 0.000 | | 1.700 | Mar 2019 | 2.500 | Jan 2020 | - | | 2.500 | 0.000 | 4.200 | - |
| Hardware Development - Warhead | C/CPIF | OTA - Northrop Grumman Innovation Systems : Plymouth, MN | 0.000 | 0.000 | | 4.000 | Mar 2019 | 18.500 | Jan 2020 | - | | 18.500 | 0.000 | 22.500 | - |
| Hardware Development - AUR | C/CPIF | OTA - Raytheon : Portsmouth, RI | 0.000 | 0.000 | | 1.000 | Mar 2019 | 8.000 | Jan 2020 | - | | 8.000 | 0.000 | 9.000 | - |
| Hardware Development - FES Development | C/CPIF | OTA - TBD : TBD | 0.000 | 0.000 | | 0.000 | Apr 2019 | 3.524 | Jan 2020 | - | | 3.524 | 0.000 | 3.524 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware Development - AUR Test Set Development | C/CPIF | OTA - TBD : TBD | 0.000 | 0.000 | | 0.000 | Apr 2019 | 11.000 | Jan 2020 | - | | 11.000 | 0.000 | 11.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 32.247 | | 110.174 | | - | | 110.174 | Continuing | Continuing | N/A |

**Remarks**

Increase from FY19 to FY20 required to for Other Transactional Agreements (OTA) for development of Stored Chemical Energy Propulsion System (SCEPS), modified Otto Fuel engine, new warhead development, new Guidance & Control (G&C) Section, and All up Round integration in support of Advanced Lightweight Torpedo development. NAVAIR increase in FY20 required for MK54 MOD 2 P-8A and Helo platform integration.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NUWC NPT : Newport, RI | 0.000 | 0.000 | | 0.200 | Nov 2018 | 1.700 | Nov 2019 | - | | 1.700 | 0.000 | 1.900 | - |
| Systems Engineering | WR | NUWC KPT : Keyport, WA | 0.000 | 0.000 | | 0.000 | Nov 2018 | 4.600 | Nov 2019 | - | | 4.600 | 0.000 | 4.600 | - |
| Hardware Development | WR | NUWC NPT : Newport, RI | 0.000 | 0.000 | | 0.200 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| Program Management Support | WR | NUWC NPT : Newport, RI | 0.000 | 0.000 | | 0.591 | Nov 2018 | 0.591 | Nov 2019 | - | | 0.591 | 0.000 | 1.182 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.991 | | 6.891 | | - | | 6.891 | 0.000 | 7.882 | N/A |

**Remarks**

Increase in FY20 to support increased development and testing efforts and integration of Safety.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604610N / *Lightweight Torpedo Development* | Project (Number/Name)<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Test and Evaluation | WR | NUWC NPT : Newport, RI | 0.000 | 0.000 | | 0.700 | Mar 2019 | 4.400 | Nov 2019 | - | | 4.400 | 0.000 | 5.100 | - |
| System Test and Evaluation | WR | NSWC IH : Indian Head, MD | 0.000 | 0.000 | | 0.200 | Mar 2019 | 0.200 | Nov 2019 | - | | 0.200 | 0.000 | 0.400 | - |
| System Test and Evaluation | C/CPIF | Raytheon : Portsmouth, RI | 0.000 | 0.000 | | 0.900 | Mar 2019 | 0.270 | Jan 2020 | - | | 0.270 | 0.000 | 1.170 | - |
| System Test and Evaluation | WR | NUWC KPT : Keyport, WA | 0.000 | 0.000 | | 1.100 | Mar 2019 | 1.400 | Nov 2019 | - | | 1.400 | 0.000 | 2.500 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 2.900 | | 6.270 | | - | | 6.270 | 0.000 | 9.170 | N/A |

**Remarks**

Increased funding for Prototype level testing in FY20 to support PDR.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/FPIF | EWCSS : Washington, DC | 0.000 | 0.000 | | 0.262 | Nov 2018 | 0.462 | Jan 2020 | - | | 0.462 | 0.000 | 0.724 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.262 | | 0.462 | | - | | 0.462 | 0.000 | 0.724 | N/A |

**Remarks**

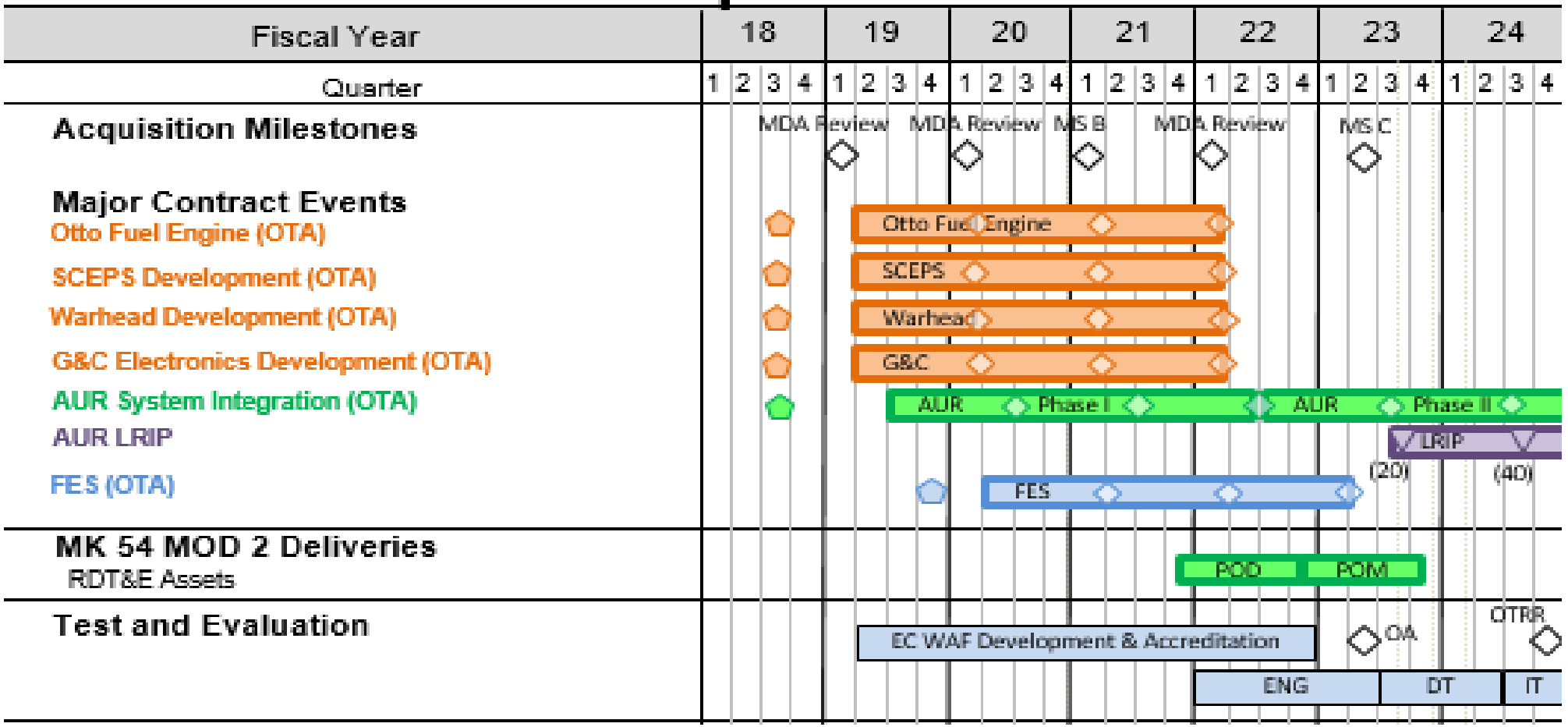
Increased Funding in FY20 to support MK54 MOD 2 program management and execution.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 36.400 | | 123.797 | | - | | 123.797 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* |

# MK 54 MOD 2 Acquisition Schedule



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604610N / *Lightweight Torpedo Development* | **Project (Number/Name)**<br>3418 / *Advanced Anti-Submarine Lightweight Torpedo* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3418*** | | | | |
| Advanced Lightweight Torpedo (ALWT): ALWT MS-B | 1 | 2021 | 1 | 2021 |
| Advanced Lightweight Torpedo (ALWT): ALWT MS C | 2 | 2023 | 2 | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT SCEPS Development | 2 | 2019 | 1 | 2022 |
| Advanced Lightweight Torpedo (ALWT): ALWT Warhead Development | 2 | 2019 | 1 | 2022 |
| Advanced Lightweight Torpedo (ALWT): ALWT G&C Hardware / Software Development | 2 | 2019 | 1 | 2022 |
| Advanced Lightweight Torpedo (ALWT): ALWT Otto Fuel Engine Development | 2 | 2019 | 1 | 2022 |
| Advanced Lightweight Torpedo (ALWT): ALWT FES Development | 2 | 2020 | 2 | 2023 |
| Advanced Lightweight Torpedo (ALWT): ALWT AUR Development Integration Phase I | 2 | 2019 | 2 | 2022 |
| Advanced Lightweight Torpedo (ALWT): ALWT Engineering Testing | 1 | 2022 | 2 | 2023 |
| Advanced Lightweight Torpedo (ALWT): Developmental Testing (DT) | 2 | 2023 | 2 | 2024 |
| Advanced Lightweight Torpedo (ALWT): Integrated Testing (IT) | 2 | 2024 | 4 | 2024 |
| Advanced Lightweight Torpedo (ALWT): OTRR | 4 | 2024 | 4 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604654N *I JT Service EOD* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 307.172 | 7.449 | 7.107 | 8.237 | - | 8.237 | 8.371 | 8.548 | 8.721 | 8.896 | Continuing | Continuing |
| 1829: *Expl Ord Disp Proc* | 307.172 | 7.449 | 7.107 | 8.237 | - | 8.237 | 8.371 | 8.548 | 8.721 | 8.896 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This program, aligned with National Defense Strategy, provides Joint Service Explosive Ordnance Disposal (EOD) and the supported Combatant Commanders with information superiority by providing for the development of Unexploded Explosive Ordnance (UXO), Improvised Explosive Devices (IED), Weapons of Mass Destruction (WMD), and weapons systems Technical Manuals. TMs, which provide key identification features, hazardous materials, and safety information, are paramount to the success of EOD Mission to; detect, locate, access, identify, Render-Safe/Neutralize, and disposal or recovery of both foreign and domestic explosive threats that pose a threat to military operations, installations, personnel, and materials.

In addition, EOD Render-Safe Procedures (RSP) of foreign ordnance and other explosive hazards must be developed as soon as possible after gaining knowledge of its existence. This
effort requires collection, exploitation, and analysis of the foreign ordnance prior to the development of EOD procedures.

The program also provides for the development and evaluation of prototypical EOD Tier Two solutions sets for threats identified in the National Response Framework. This effort provides resources essential to the Foreign Threat Mine Acquisition/Exploitation (FTMA/E) program that includes; acquisition, inert certification, intelligence and operational
exploitation, analysis, procedure development, and disposition of the highest priority foreign threat naval mines.

As defined in DOD Directive 5160.62, assigns the Secretary of the Navy (SECNAV) the responsibility of Executive Agent for Explosive Ordnance Disposal (EOD) Technology and Training (T&T). The Executive Agent for EOD T&T is to provide for the preparation, technical development, validation, Joint Service approval, and distribution of all EOD procedures
and countermeasures to include; publications, manuals, bulletins, texts, and graphic aids. This program is a non-acquisition program (without traditional acquisition milestones) with on-going, continuous delivery of urgent and periodic documented procedures and publications for mines, ordnance items, weapons systems, Improvised Explosive Devices, Weapons of Mass Destruction, and related explosive hazards.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604654N / *JT Service EOD* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 7.561 | 7.107 | 7.416 | - | 7.416 |
| Current President's Budget | 7.449 | 7.107 | 8.237 | - | 8.237 |
| Total Adjustments | -0.112 | 0.000 | 0.821 | - | 0.821 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.112 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 0.821 | - | 0.821 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

FY 2020: Funding was increased by $0.821M to support required EOD publications.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604654N / *JT Service EOD* | | | | Project (Number/Name)<br>1829 / *Expl Ord Disp Proc* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1829: *Expl Ord Disp Proc* | 307.172 | 7.449 | 7.107 | 8.237 | - | 8.237 | 8.371 | 8.548 | 8.721 | 8.896 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program, aligned with National Defense Strategy, provides Joint Service Explosive Ordnance Disposal (EOD) and the supported Combatant Commanders with information superiority by providing for the development of Unexploded Explosive Ordnance (UXO), Improvised Explosive Devices (IED), Weapons of Mass Destruction (WMD), and weapons systems Technical Manuals. TMs, which provide key identification features, hazardous materials, and safety information, are paramount to the success of EOD Mission to; detect, locate, access, identify, Render-Safe/Neutralize, and disposal or recovery of both foreign and domestic explosive threats that pose a threat to military operations, installations, personnel, and materials.

In addition, EOD Render-Safe Procedures (RSP) of foreign ordnance and other explosive hazards must be developed as soon as possible after gaining knowledge of its existence. This
effort requires collection, exploitation, and analysis of the foreign ordnance prior to the development of EOD procedures.

The program also provides for the development and evaluation of prototypical EOD Tier Two solutions sets for threats identified in the National Response Framework. This effort provides resources essential to the Foreign Threat Mine Acquisition/Exploitation (FTMA/E) program that includes; acquisition, inert certification, intelligence and operational
exploitation, analysis, procedure development, and disposition of the highest priority foreign threat naval mines.

As defined in DOD Directive 5160.62, assigns the Secretary of the Navy (SECNAV) the responsibility of Executive Agent for Explosive Ordnance Disposal (EOD) Technology and Training (T&T). The Executive Agent for EOD T&T is to provide for the preparation, technical development, validation, Joint Service approval, and distribution of all EOD procedures
and countermeasures to include; publications, manuals, bulletins, texts, and graphic aids. This program is a non-acquisition program (without traditional acquisition milestones) with on-going, continuous delivery of urgent and periodic documented procedures and publications for mines, ordnance items, weapons systems, Improvised Explosive Devices, Weapons of Mass Destruction, and related explosive hazards.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** Render-Safe Procedures Development | 2.661 | 2.796 | 3.806 | 0.000 | 3.806 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Develop specific Explosive Ordnance Disposal (EOD) Technical Manuals which include the key identification features, functionality, hazardous components, safeties and warnings, Render Safe and Disposal procedures, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604654N / *JT Service EOD* | Project (Number/Name)<br>1829 / *Expl Ord Disp Proc* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| for U.S. and foreign ordnance items. Technical Manual development is accomplished through collection, exploitation, analysis, and reverse engineering through the analysis, exploitation, and reverse engineering of these ordnance items.<br>***FY 2020 Base Plans:***<br>Develop specific Explosive Ordnance Disposal (EOD) Technical Manuals which include the key identification features, functionality, hazardous components, safeties and warnings, Render Safe and Disposal procedures, for U.S. and foreign ordnance items. Technical Manual development is accomplished through collection, exploitation, analysis, and reverse engineering through the analysis, exploitation, and reverse engineering of these ordnance items.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY2019 to FY2020 is to increase the development of Technical Manuals with no coverage. No coverage means there has been ordnance located with no development for EOD Warfighter to identify and/or rendersafe for disposal procedures. | | | | | |
| ***Title:*** Improvised Explosive Device (IED), Weapons of Mass Destruction (WM) Countermeasures | 2.338 | 1.839 | 1.927 | 0.000 | 1.927 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Develop Tactics, Techniques, and Procedures (TTP), and EOD Technical Manuals to counter Improvised Explosive Devices (IED), conventional and homemade explosive materials and their precursors, and Chemical, Biological, Nuclear, and Radiological (CBRN) agents and dispersal devices (both improvised and conventional). Additionally, develop Special Weapons Operation Publications (SWOP) publications as part of the Joint Nuclear Weapons Publication System (JNWPS) process.<br>***FY 2020 Base Plans:***<br>Increase to address solution and informational products enabling the desensitization of explosives and explosive procedures. This includes the development, testing, and validation of materials and solutions to reduce sensitivity of primary and Homemade explosives.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604654N / *JT Service EOD* | **Project (Number/Name)**<br>1829 / *Expl Ord Disp Proc* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increases allows additional development of EOD mission threats in support of National Defense Strategy. | | | | | |
| ***Title:*** Foreign Mine Acquisition | 2.450 | 2.472 | 2.504 | 0.000 | 2.504 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Acquire foreign mines and mine related materials as prioritized by Foreign Mine Planning Group (FMPG) to support development of U.S. Navy countermeasures for these items and development of EOD Technical Manuals. | | | | | |
| ***FY 2020 Base Plans:***<br>Acquire foreign mines and related materials as prioritized by Foreign Mine Plan Group(FMPG) to support component exploitation resulting in development of EOD 60 series Technical Manual and development of Naval Surface and submarine warfare countermeasures. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY2019 to FY2020 is in accordance with planned program profile. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.449 | 7.107 | 8.237 | 0.000 | 8.237 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

This is a non-acquisition program.

**E. Performance Metrics**

Analyzed and exploited foreign and domestic ordnance resulting in the development of 3,331 ordnance and weapons systems publications providing essential identification features, functioning characteristics, safety information and other EOD specific technical information to include 64 validated Render-Safe and Disposal procedures. Additionally, 222 Improvised Explosive Device (IED) and Weapons of Mass Destruction (WMD) publications were developed or updated which included the development and validation of 3 EOD specific Render-Safe/Neutralization procedures.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604654N / *JT Service EOD* | Project (Number/Name)<br>1829 / *Expl Ord Disp Proc* | |

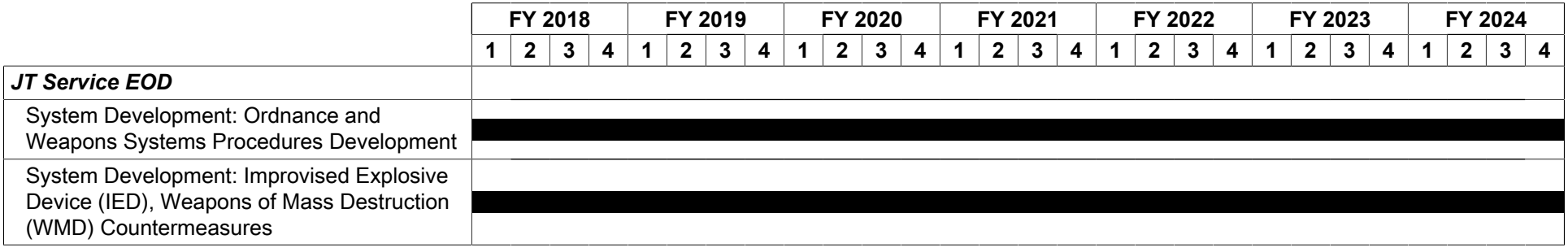
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Foreign Mine Acquisition | WR | NSWCIHEODTD : Indian Head, MD | 12.757 | 1.946 | Nov 2017 | 1.859 | Nov 2018 | 2.270 | Nov 2019 | - | | 2.270 | Continuing | Continuing | Continuing |
| Special Mission OCO | WR | NSWCIHEODTD : Indian Head, MD | 3.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.500 | - |
| Ordnance and Weapons Systems Procedures Development | WR | NSWCIHEODTD : Indian Head, MD | 192.212 | 2.660 | Nov 2017 | 2.709 | Nov 2018 | 3.446 | Nov 2019 | - | | 3.446 | Continuing | Continuing | Continuing |
| Improvised Explosive Device {IED}, Weapons of Mass Destruction {WMD} Countermeasures | WR | NSWCIHEODTD : Indian Head, MD | 53.224 | 2.131 | Nov 2017 | 1.829 | Nov 2018 | 1.825 | Nov 2019 | - | | 1.825 | Continuing | Continuing | Continuing |
| Foreign Mine Acquisition | WR | NSWCPC : Panama City, FL | 23.450 | 0.130 | Nov 2017 | 0.130 | Nov 2018 | 0.130 | Nov 2019 | - | | 0.130 | Continuing | Continuing | Continuing |
| Program Management Personnel | WR | NSWCIHEODTD : Indian Head, MD | 4.940 | 0.275 | Oct 2017 | 0.280 | Nov 2018 | 0.250 | Nov 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| Miscellaneous | WR | NSWCIHEODTD : Indian Head, MD | 17.089 | 0.307 | Nov 2017 | 0.300 | Nov 2018 | 0.316 | Nov 2019 | - | | 0.316 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 307.172 | 7.449 | | 7.107 | | 8.237 | | - | | 8.237 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 307.172 | 7.449 | | 7.107 | | 8.237 | | - | | 8.237 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604654N / *JT Service EOD* | **Project (Number/Name)**<br>1829 / *Expl Ord Disp Proc* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604654N / *JT Service EOD* | **Project (Number/Name)**<br>1829 / *Expl Ord Disp Proc* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JT Service EOD*** | | | | |
| System Development: Ordnance and Weapons Systems Procedures Development | 1 | 2018 | 4 | 2024 |
| System Development: Improvised Explosive Device (IED), Weapons of Mass Destruction (WMD) Countermeasures | 1 | 2018 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604657M *I (U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 0.000 | 0.000 | 22.000 | - | 22.000 | 20.000 | 5.000 | 0.000 | 0.000 | 0.000 | 47.000 |
| 7400: *Combat Capability Development Transition* | 0.000 | 0.000 | 0.000 | 22.000 | - | 22.000 | 20.000 | 5.000 | 0.000 | 0.000 | 0.000 | 47.000 |

**A. Mission Description and Budget Item Justification**

Organic Precision Fires (OPF) - OPF is a tiered scalable weapon system that will provide Marines the ability to accurately attack and destroy targets throughout the battle space. OPF will provide a man portable and multiple vehicular mounted systems supporting multiple echelons within the MAGTF. OPF will provide an organic fires capability that will increase lethality of the MAGTF, reduce collateral damage, and provide an affordable precision strike fire support system. The OPF will transition from the RCO to PM Fires as an evolutionary acquisition program to incrementally develop and deliver a vendor provided munition capable of destroying multiple target sets

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 0.000 | 0.000 | 22.000 | - | 22.000 |
| Total Adjustments | 0.000 | 0.000 | 22.000 | - | 22.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 22.000 | - | 22.000 |

**Change Summary Explanation**

Increase of $22.0M from FY19 to FY20 supports the initiation of developmental testing as well as the development of additional capabilities beyond the efforts conducted prior to OPF's transition from BA04/PE 0604320M/Project 9999.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604657M / *(U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* | Project (Number/Name)<br>7400 / *Combat Capability Development Transition* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7400: *Combat Capability Development Transition* | 0.000 | 0.000 | 0.000 | 22.000 | - | 22.000 | 20.000 | 5.000 | 0.000 | 0.000 | 0.000 | 47.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

OPF transitions from the BA04/PE 0604320M/Project 9999 to BA05/PE 0604657M/Project 7400 (Combat Capability Development Transition) in order to align the efforts initiated in FY20 to the appropriate budget activity. This was the result of a Congressional Add in FY 2018 for Rapid Technology Capability Prototypes - not reflected in the previous budget exhibit due to the timing of the submission.

**A. Mission Description and Budget Item Justification**

Organic Precision Fires (OPF) - OPF is a tiered scalable weapon system that will provide Marines the ability to accurately attack and destroy targets throughout the battle space. OPF will provide a man portable and multiple vehicular mounted systems supporting multiple echelons within the MAGTF. OPF will provide an organic fires capability that will increase lethality of the MAGTF, reduce collateral damage, and provide an affordable precision strike fire support system.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Organic Precision Fires (OPF) | 0.000 | 0.000 | 22.000 | 0.000 | 22.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>- Initiate development of an interchangeable platform capable of supporting multiple MAGTF prime movers.<br>- Initiate integration of the OPF capability into existing video downlink, Command and Control, and fire support systems.<br>- Initiate multi-user, multi-munition, and swarming capabilities.<br>- Initiate developmental testing and begin safety and cybersecurity certifications. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604657M / *(U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* | **Project (Number/Name)**<br>7400 / *Combat Capability Development Transition* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase of $22.0M from FY19 to FY20 is to support the intial Development of the OPF. Funding for the OPF has been provided to develop a vehicular mounted precision organic indirect fires system to mitigate a capability gap that cannot be addressed by current fire support systems. OPF will provide the ability for Marines at different echelons to quickly and accurately attack targets at varying ranges in response to mission requirements. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 22.000 | 0.000 | 22.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/4733: *FIRE SUPPORT SYSTEM* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 20.000 | 27.000 | 27.000 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The OPF will be an evolutionary acquisition program to incrementally develop and deliver a vendor provided munition capable of destroying multiple target sets. OPF will be integrated with a government developed and owned mounting platform and command and control system. This strategy will allow the program office to procure munitions from multiple vendors resulting in reduced costs. This strategy will also allow the program office to focus future efforts on development of munitions that are vehicle and C2 agnostic.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604657M / *(U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* | Project (Number/Name)<br>7400 / *Combat Capability Development Transition* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPF Development | C/FFP | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 18.128 | Feb 2020 | - | | 18.128 | 0.000 | 18.128 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 18.128 | | - | | 18.128 | 0.000 | 18.128 | N/A |

**Remarks**

Develop the OPF capability to support the MGTAF

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPF Engineering Support | MIPR | PM AMRDEC : Huntsville, AL | 0.000 | 0.000 | | 0.000 | | 1.957 | Nov 2019 | - | | 1.957 | 0.000 | 1.957 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.957 | | - | | 1.957 | 0.000 | 1.957 | N/A |

**Remarks**

Engineering, Information Assurance and Safety Support

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OPF Developmental Test | MIPR | PM AMRDEC : Huntsville, AL | 0.000 | 0.000 | | 0.000 | | 1.915 | Nov 2019 | - | | 1.915 | 0.000 | 1.915 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.915 | | - | | 1.915 | 0.000 | 1.915 | N/A |

**Remarks**

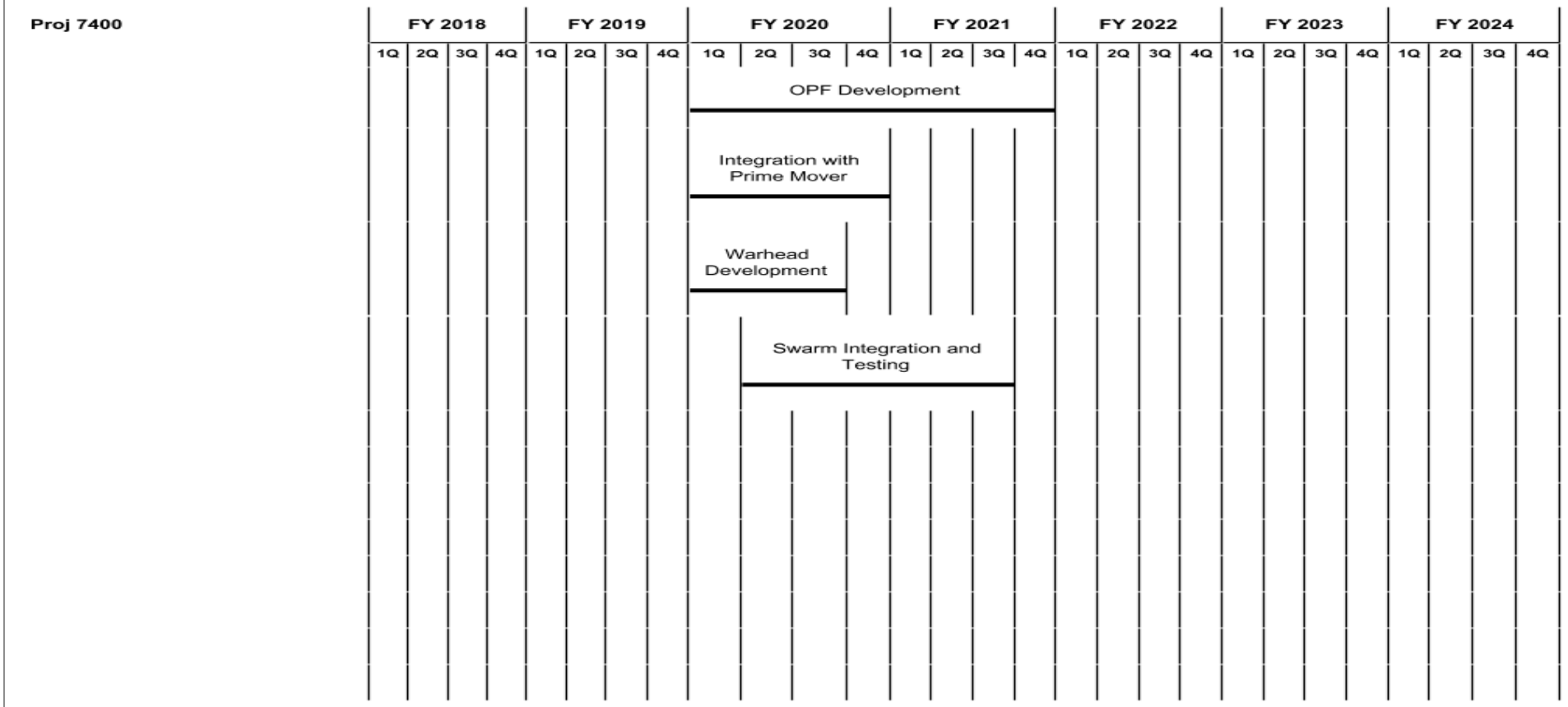
Conduct developmental testing of OPF

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604657M / *(U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* | Project (Number/Name)<br>7400 / *Combat Capability Development Transition* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 22.000 | | - | | 22.000 | 0.000 | 22.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604657M / *(U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* | **Project (Number/Name)**<br>7400 / *Combat Capability Development Transition* |




*2020OSD - 0604657M - 7400*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604657M / *(U)MARINE CORPS GROUND COMBAT/SUPPORTING ARMS SYST* | **Project (Number/Name)**<br>7400 / *Combat Capability Development Transition* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 7400*** | | | | |
| OPF Development | 1 | 2020 | 4 | 2021 |
| Integration with Prime Mover | 1 | 2020 | 4 | 2020 |
| Warhead Development | 1 | 2020 | 3 | 2020 |
| Swarm Integration and Testing | 2 | 2020 | 3 | 2021 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604703N *I Personnel, Trng, Sim, & Human Factors* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 36.366 | 24.229 | 6.539 | 5.500 | - | 5.500 | 9.105 | 8.830 | 8.128 | 8.290 | Continuing | Continuing |
| 1822: *Manpower Pers & Human Fact System* | 36.366 | 24.229 | 6.539 | 5.500 | - | 5.500 | 9.105 | 8.830 | 8.128 | 8.290 | Continuing | Continuing |

**Note**

Research and Development funds for Manpower, Personnel, Training and Education (MPT&E) Transformation under PE 0604703N have been consolidated within PE 0605013N Project Unit 2905 starting in FY19.

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $2.160 million to account for the availability of prior year execution balances.

This program is funded under RDT&E operational systems development because it encompasses engineering and development of new end-items prior to production approval decision and the upgrading and enhancement of existing Manpower, Personnel, Training and Education (MPT&E) decision support systems, tools and models.

This non-acquisition category program provides funds for continued R&D for broader application of advanced technologies to transition successful research proof-of-concept demonstrations into operational use. This Program Element (PE) provides funding to support the transition of models and decision support tools from RDT&E funded to production and into the hands of analysts and program managers throughout the Manpower, Personnel, Training and Education enterprise. The PE also supports the application of proven industry models, tools and methodologies to Navy MPT&E problems where government-off-the-shelf (GOTS) solutions are non-existent. The second goal of the PE is to successfully implement 90% of the industry-standard tools that are attempted to be used in Navy applications. In this case the Naval War College procuring and modifying an integrated, state-of-the-art information management / knowledge-management (IM / KM) system that environment that supports the College's unique educational and research activities. Informed by IM/KM best practices, elements of this environment will enhance the Naval War College (NWC) ability to achieve objectives in its mission areas of education, research, cooperative / international engagement, and combat readiness. This effort will allow NWC to support the Chairman Joint Chiefs of Staff (CJCS) vision for education as a career/lifelong learning endeavors, Navy's education strategy and CNO's Sailor 2025 initiative by dramatically increasing NWC communication of research, gaming and education results to the broader military and Navy communities.

Faced with complex challenges to efficiently and effectively attract, develop, and retain Navy Sailors, the Department has prepared an MPT&E Transformation plan to combat threats to mission readiness. The strategic vision and desired end-state of the endeavor is a holistic modernization of models, processes, and information technology, to dramatically improve the quality of MPT&E service delivery. There are too many Legacy IT Systems, an overly complex data management system, and limited Sailor-Self-Service options with no mobile access. The IT Transformation will focus on two primary strategies: maximizing the utilization of commercial-off-the-shelf (COTS) technologies and the implementation of cloud based technologies. Together these two approaches will improve both the service to Sailors and to Fleet readiness, reduce our technology footprint and increase accountability and audit readiness.

Research and Development funds for MPT&E Transformation under PE 0604703N have been consolidated within PE 0605013N Project Unit 2905 starting in FY19.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604703N *I Personnel, Trng, Sim, & Human Factors* |

In accordance with the MPT&E transformation plan, legacy systems will be replaced by modern and robust solutions that better support Navy's ability to execute its mission and efficiently allocate its resources. The Department will provide the access, schematics, and other pertinent information regarding the existing architecture, artifacts, and visualizations to enable this transformation. Migrating the data housed within these disparate systems to centralized, COTS-configured applications will reduce costs, eliminate redundancy, and streamline processes in accordance with the goals set forth in the transformational effort strategy. There are four key activities that set the foundation for holistic MPT&E transformation:

1) Navy Personnel and Pay System (NP2) includes Navy Personnel and Pay (NP2)Standard modernization and the collapse of Legacy Manpower System functionality;

2) Single Point of Entry (SPOE) for Sailor self-service is composed of My Navy Portal (MNP), Identity and Access Management (IdAM), a Customer Relations Management (CRM) solution, and a centralized and standardized customer service center (The My Navy Career Center (MNCC));

3) Learning Stack (LS) improves the accessibility, sophistication, and collaborative nature of educational outreach;

4) Authoritative Data Environment (ADE) will enable the collapse of 9 legacy data warehouses into a single, authoritative source of data truth for Sailors and Navy decision makers. Additionally, ADE will enable modern data analytics and business intelligence capabilities.

All of the technology solutions will leverage hyperscale cloud based services in order to provide secure, accessible and cost effective business IT.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 40.828 | 6.539 | 7.660 | - | 7.660 |
| Current President's Budget | 24.229 | 6.539 | 5.500 | - | 5.500 |
| Total Adjustments | -16.599 | 0.000 | -2.160 | - | -2.160 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.499 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -2.160 | - | -2.160 |
| • Congressional Directed Reductions Adjustments | -16.100 | - | - | - | - |

**Change Summary Explanation**

Technical: Not applicable.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604703N *I Personnel, Trng, Sim, & Human Factors* |

Schedule: Not applicable.

Funding is required to address Studies and analysis in addition to the MPT&E Transformation plan. Transformation funds support Strategy, Architecture, Design, Requirements Definition, and Business Processes Re-Engineering for Single Point of Entry (SPOE), Authoritative Data Environment (ADE), and MPT&E Core efforts. Continuing to maintain outdated software developed in obsolete programming languages presents an increasing demand on Navy resources that cannot be sustained in perpetuity. Integration and updated technology will enable Sailors to transmit decisions from a mobile environment and unlock data stores for leaders that will provide visibility to enable more effective and efficient management.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | | | | Project (Number/Name)<br>1822 / *Manpower Pers & Human Fact System* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 1822: *Manpower Pers & Human Fact System* | 36.366 | 24.229 | 6.539 | 5.500 | - | 5.500 | 9.105 | 8.830 | 8.128 | 8.290 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program is under RDT&E operational systems development because it encompasses engineering and development of new end-items prior to production approval decision and the upgrading and enhancement of existing Manpower, Personnel, Training and Education (MPT&E) decision support systems, tools and models.

This non-acquisition category program provides funds for continued R&D for broader application of advanced technologies to transition successful research proof-of-concept demonstrations into operational use. This Program Element (PE) provides funding to support the transition of models and decision support tools from RDT&E funded to production and into the hands of analysts and program managers throughout the Manpower, Personnel, Training and Education enterprise. The PE also supports the application of proven industry models, tools and methodologies to Navy MPT&E problems where government-off-the-shelf (GOTS) solutions are non-existent. The second goal of the PE is to successfully implement 90% of the industry-standard tools that are attempted to be used in Navy applications. In this case the Naval War College procuring and modifying an integrated, state-of-the-art information management / knowledge-management (IM / KM) system that environment that supports the College's unique educational and research activities. Informed by IM/KM best practices, elements of this environment will enhance the Naval War College (NWC) ability to achieve objectives in its mission areas of education, research, cooperative / international engagement, and combat readiness. This effort will allow NWC to support the Chairman Joint Chiefs of Staff (CJCS) vision for education as a career/lifelong learning endeavors, Navy's education strategy and CNO's Sailor 2025 initiative by dramatically increasing NWC communication of research, gaming and education results to the broader military and Navy communities.

Faced with complex challenges to efficiently and effectively attract, develop, and retain Navy Sailors, N1 has prepared an MPT&E Transformation plan to combat threats to mission readiness. The strategic vision and desired end-state of the endeavor is a holistic modernization of models, processes, and information technology, to dramatically improve the quality of MPT&E service delivery. There are too many Legacy IT Systems, an overly complex data management system, and limited Sailor-Self-Service options with no mobile access. The IT Transformation will focus on two primary strategies: maximizing the utilization of commercial-off-the-shelf (COTS) technologies and the implementation of cloud based technologies. Together these two approaches will improve both the service to Sailors and to Fleet readiness, reduce our technology footprint and increase accountability and audit readiness.

Research and Development funds for MPT&E Transformation under PE 0604703N have been consolidated within PE 0605013N Project Unit 2905 starting in FY19.

In accordance with the MPT&E transformation plan, legacy systems will be replaced by modern and robust solutions that better support Navy's ability to execute its mission and efficiently allocate its resources. N1 will provide the access, schematics, and other pertinent information regarding the existing architecture, artifacts, and visualizations to enable this transformation. Migrating the data housed within these disparate systems to centralized, COTS-configured applications will reduce costs, eliminate redundancy, and streamline processes in accordance with the goals set forth in the transformational effort strategy. There are four key activities that set the foundation for holistic MPT&E transformation:

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

1) Navy Personnel and Pay System (NP2) includes Navy Personnel and Pay (NP2)Standard modernization and the collapse of Legacy Manpower System functionality;

2) Single Point of Entry (SPOE) for Sailor self-service is composed of My Navy Portal (MNP), Identity and Access Management (IdAM), a Customer Relations Management (CRM) solution, and a centralized and standardized customer service center (The My Navy Career Center (MNCC));

3) Learning Stack (LS) improves the accessibility, sophistication, and collaborative nature of educational outreach;

4) Authoritative Data Environment (ADE) will enable the collapse of 9 legacy data warehouses into a single, authoritative source of data truth for Sailors and Navy decision makers. Additionally, ADE will enable modern data analytics and business intelligence capabilities.

All of the technology solutions will leverage hyperscale cloud based services in order to provide secure, accessible and cost effective business IT.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Manpower Pers & Human Fact System | 4.129 | 6.539 | 5.500 | 0.000 | 5.500 |
| ***Articles:*** | 5 | 7 | 6 | - | 6 |
| ***Description:*** This program is funded under RDT&E operational systems development because it encompasses engineering and development of new end-items prior to production approval decision and the upgrading and enhancement of existing Manpower, Personnel, Training, and Education (MPT&E) decision support systems, tools and models.<br><br>This non-acquisition category program provides funds for continued R&D for broader application of advanced technologies to transition successful research proof-of-concept demonstrations into operational use. This Program Element (PE) provides funding to support the transition of models and decision support tools from RDT&E funded to production and into the hands of analysts and program managers throughout the MPT&E enterprise. The PE also supports the application of proven industry models, tools and methodologies to Navy MPT&E problems where government-off-the-shelf (GOTS) solutions are non-existent. Faced with complex challenges to efficiently and effectively attract, develop, and retain Navy Sailors, N1 has prepared an MPT&E Transformation plan to combat threats to mission readiness. The strategic vision and desired end-state of the endeavor is a holistic modernization of models, processes, and information technology, to dramatically improve the quality of MPT&E service delivery. There are too many Legacy IT Systems, an overly complex data management system, and limited Sailor-Self-Service options with no mobile access. The IT Transformation will focus on two primary strategies: maximizing the utilization of commercial-off-the-shelf (COTS) technologies and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| the implementation of cloud based technologies. Together these two approaches will improve both the service to Sailors and to Fleet readiness, reduce our technology footprint and increase accountability and audit readiness.<br><br>In accordance with the MPT&E transformation plan, legacy systems will be replaced by modern and robust solutions that better support Navy's ability to execute its mission and efficiently allocate its resources. N1 will provide the access, schematics, and other pertinent information regarding the existing architecture, artifacts, and visualizations to enable this transformation. Migrating the data housed within these disparate systems to centralized, COTS-configured applications will reduce costs, eliminate redundancy, and streamline processes in accordance with the goals set forth in the transformational effort strategy. There are four key activities that set the foundation for holistic MPT&E transformation:<br>- Establish a Core Suite of Integrated HR Business Systems (MPT&E Core) - Integrated pay and personnel system to make the navy system accurate, timely and audit ready.<br>- Establish World Class Sailor Self Service and Single Point of Entry (SPOE) - Put the Sailor "on-line" and provide access to their records via their smart phone in a Sailor friendly way. SPOE provides a single Web, Mobile, and Telephonic gateway for Sailors, Fleet leaders, and HR Professionals to access personnel systems and services. SPOE includes the standup and launch of the MyNavy Career Center which replaces 64 legacy Personnel Service Detachments with 2 centralized, modern, Sailor friendly call and service centers. In addition to labor costs, stand-up of the MNCC requires minor upgrades existing Navy Call Center facilities (Telephony) and implementation of modern Customer Relations Management software to allow initiation, tracking, and resolution of personnel action requests. SPOE also includes the creation of a web and mobile enabled portal that provides single sign on access to MPT&E IT applications via identity and access management, ability to generate action and service requests via the underlying Customer Relations Management software, and ability to conduct most needed personnel system actions via self-service.<br>- Conduct Strategy, Architecture, Design, Requirements Definition, and Business Processes Re-engineering (Support / Infrastructure) - Fundamentally automate manual, mundane, "business as usual" processes and procedures to dramatically improve performance and reduce costs. Shift away from Navy data centers to fee for service, cloud based hosting.<br>- Establish an Authoritative Data Environment and Comprehensive Analytics (ADE) - Create a single source of data truth supporting HR systems and provide a full suite of prescriptive, predictive, and descriptive analytics to both leadership and Sailors alike. ADE provides an accelerated path to good data and good analytics enabling good decisions. A modern, scalable cloud-based data environment using an API layer to deliver on "single source of truth" and adv. analytics (subsuming all other MPTE data sources); effort includes establishment of a data lake for analytics. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Transformation leverages activities in existing programs of record and reshapes them to achieve a unified strategy and vision for IT and non-IT service delivery. Modernizing, integrating, and consolidating existing programs of record accelerates transformation while making the most of existing Navy resources. Additionally, transitioning legacy systems to COTS-configured applications will reduce costs, eliminate redundancy, and streamline processes in accordance with the goals set forth in the transformational effort strategy.<br><br>***FY 2019 Plans:***<br>- Continue Training and Supply Chain Management Decision Support Systems integration and transition.<br>- Continue Community Management and Strength Planning Model Enhancements and Integration.<br>- Continue Development of Training Capacity Tradeoff Model.<br>- Continue Enhancements of Products delivered via World Class Modeling.<br>- Continue Transition of STAMPS Manpower Planning Optimization Tool (MPOT) and finalize documentation<br>.- Continue of Model Integration (Model Integration in the Transition Tail for the Manpower, Personnel, and Training Strategic Planning Application Science and Technology initiative that began in FY17 and ends in FY22. This S&T initiative will develop a modeling integration architecture enabling the MPTE Enterprise/domain to fully integrate their suite of models into a single environment. Products from the S&T initiative will be in spiral development and begin delivery in Fiscal Year 19.<br>Begin the S&T development of tool to support Ready, Relevant, Learning delivery systems of PQS<br>- Continue Recruiting tools and Selection Criteria algorithms.<br>- Small Business Innovative Research (SBIR).<br><br>***FY 2020 Base Plans:***<br>- Continue Training and Supply Chain Management Decision Support Systems integration and transition.<br>- Continue Community Management and Strength Planning Model Enhancements and Integration-<br>- Continue Development of Training Capacity Tradeoff Model.<br>- Continue Enhancements of Products delivered via World Class Modeling.<br>- Continue of Model Integration (Model Integration in the Transition Tail for the Manpower, Personnel, and Training Strategic Planning Application Science and Technology intiative that began in FY17 and ends in FY22. This S&T initiative will develop a modeling integration architecture enabling the MPTE Enterprise/domain to fully integrate their suite of models into a single environment. Productws from the S&T initiative will be in spiral development and begin delivery in Fiscal Year 19.<br>- Continue S&T development of tool to support Ready, Relevant, Learning delivery systems of PQS. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue Recruiting tools and Selection Criteria algorithms.<br>- Small Business Innovative Research (SBIR).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in FY20 is due to the availability of prior year execution balances, which reduced program dollars in the amount of -$2.160M. | | | | | |
| ***Title:*** Transformation (MPTE Core)<br>***Articles:***<br>***Description:*** MPT&E Core: Core technology includes Navy Standard Integrated Personnel System (NSIPS) and Learning Management System Distance Learning (LMS-DL). Most other legacy HR business systems will collapse into MPT&E Core.<br>Supports an incremental roll-out of MPT&E enterprise solution (field test); Navy's consolidation efforts to migrate systems into the cloud; also includes contract support for a detailed plan and implementation efforts for the 55-1 rationalization plan, data integration, cloud adoption, technical architecture and system engineering support. Included in this is legacy decomposition that will include functional assessments, reviews of business processes and technical architecture.<br>***FY 2019 Plans:***<br>Transformation funding will be executed under BSO39 beginning in FY19 and out.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 15.100<br>1 | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Transformation Authoritative Data Environment (ADE)<br>***Articles:***<br>***FY 2019 Plans:***<br>Transformation funding will be executed under BSO39 beginning in FY19 and out.<br>***FY 2020 Base Plans:*** | 5.000<br>1 | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 24.229 | 6.539 | 5.500 | 0.000 | 5.500 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

This Program Element (PE) provides funding to support the transition of models and decision support tools from RDT&E funded research, Science and Technology (6.2-6.3), to production and into the hands of analysts and program managers throughout the Manpower, Personnel, Training and Education enterprise. The PE also supports the application of proven industry models, tools and methodologies to Navy MPTE problems where GOTS solutions are non-existent. One goal of this PE is to transition 90% of successful S&T products to production while distributing 80% of successful educational and research products from the Naval War College (NWC) to a broader Navy audience to be used by USN Sailors and civilians. The second goal of the PE is to successfully implement 90% of the industry-standard tools that are attempted to be used in Navy applications and the existing NWC web based applications and products into the new information Management/knowledge Management (IM/KM) system for broader dissemination. This PE includes Transformation Strategy, Architecture, Design, Requirements Definition, and Business Processes Re-Engineering occurring primarily in BSO 22.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | Project (Number/Name)<br>1822 / *Manpower Pers & Human Fact System* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Allot | NPRST : Millington, TN | 9.140 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Development Support | Allot | CNP : Washington, DC | 11.900 | 1.429 | Jan 2018 | 4.739 | Jan 2019 | 4.000 | Jan 2020 | - | | 4.000 | Continuing | Continuing | Continuing |
| Development Support | Allot | NPC PMW-240 : Millington, TN | 2.630 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.630 | - |
| Development Support | Allot | NAWC-TSD : Orlando, FL | 2.045 | 0.900 | Nov 2018 | 1.800 | Nov 2019 | 1.500 | Jan 2020 | - | | 1.500 | Continuing | Continuing | Continuing |
| Development Support | Allot | SPAWAR : New Orleans, LA | 3.300 | 1.800 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 3.600 | 8.700 | - |
| Development Support | Allot | NPC, HP Texas : Millington, TN | 1.450 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.450 | - |
| Development Support | Allot | CNRC PMW 240 : Millington, TN | 3.700 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.700 | - |
| Development Support | Allot | NWC : Newport, RI | 0.692 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.692 | - |
| Transformation ADE Data and Analytics | Allot | PMW-240 : Various Locations | 0.000 | 5.000 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Transformation MPTE Core Pilot Launch | Allot | PMW-240 : Various Locations | 1.509 | 15.100 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 36.366 | 24.229 | | 6.539 | | 5.500 | | - | | 5.500 | Continuing | Continuing | N/A |

**Remarks**

The decrease in FY20 is due to a DON20 RDTEN Under Execution Review mark, which reduced program dollars in the amount of -$2.160M.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Need Item Text | C/BA | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | N/A |

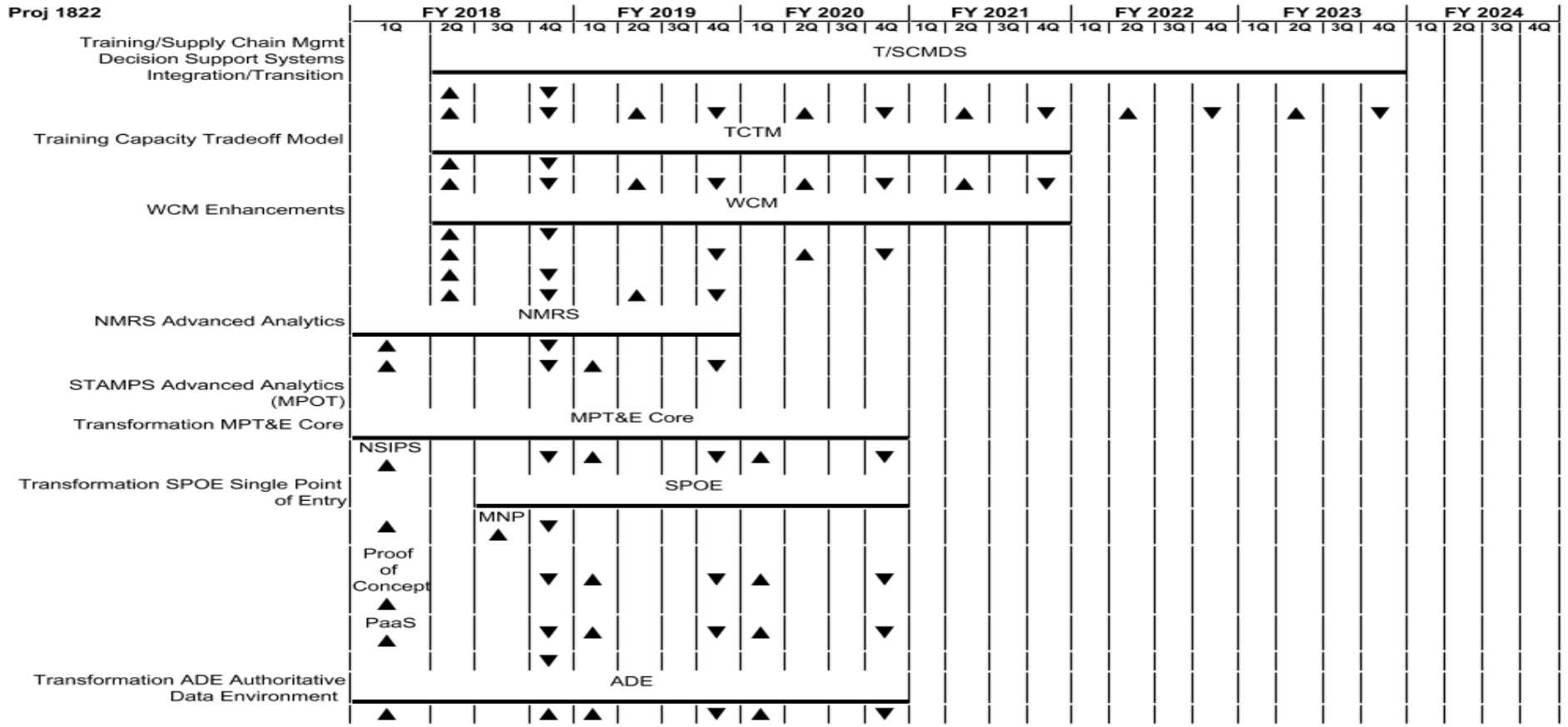
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | Project (Number/Name)<br>1822 / *Manpower Pers & Human Fact System* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 36.366 | 24.229 | | 6.539 | | 5.500 | | - | | 5.500 | Continuing | Continuing | N/A |

**Remarks**

The decrease in FY20 is due to a DON20 RDTEN Under Execution Review mark, which reduced program dollars in the amount of -$2.160M.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |




*2020DON - 0604703N - 1822*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 1822*** | | | | |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: Training/Supply Chain Mgmt Decision Support Systems Integration/Transition | 2 | 2018 | 4 | 2023 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS 7 | 2 | 2018 | 2 | 2018 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS 8 | 4 | 2018 | 4 | 2018 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS 9 | 2 | 2018 | 2 | 2018 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS I0 | 4 | 2018 | 4 | 2018 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS I1 | 2 | 2019 | 2 | 2019 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS I2 | 4 | 2019 | 4 | 2019 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS I3 | 2 | 2020 | 2 | 2020 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS I4 | 4 | 2020 | 4 | 2020 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS 15 | 2 | 2021 | 2 | 2021 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS 16 | 4 | 2021 | 4 | 2021 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/SCMDS 17 | 2 | 2022 | 2 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/ SCMDS 18 | 4 | 2022 | 4 | 2022 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/ SCMDS 19 | 2 | 2023 | 2 | 2023 |
| Training/Supply Chain Mgmt Decision Support Systems Integration/Transition: T/ SCMDS 20 | 4 | 2023 | 4 | 2023 |
| Training Capacity Tradeoff Model: Training Capacity Tradeoff Model | 2 | 2018 | 4 | 2021 |
| Training Capacity Tradeoff Model: TCTM 7 | 2 | 2018 | 2 | 2018 |
| Training Capacity Tradeoff Model: TCTM 8 | 4 | 2018 | 4 | 2018 |
| Training Capacity Tradeoff Model: TCTM 9 | 2 | 2018 | 2 | 2018 |
| Training Capacity Tradeoff Model: TCTM 10 | 4 | 2018 | 4 | 2018 |
| Training Capacity Tradeoff Model: TCTM 11 | 2 | 2019 | 2 | 2019 |
| Training Capacity Tradeoff Model: TCTM 12 | 4 | 2019 | 4 | 2019 |
| Training Capacity Tradeoff Model: TCTM 13 | 2 | 2020 | 2 | 2020 |
| Training Capacity Tradeoff Model: TCTM 14 | 4 | 2020 | 4 | 2020 |
| Training Capacity Tradeoff Model: TCTM 15 | 2 | 2021 | 2 | 2021 |
| Training Capacity Tradeoff Model: TCTM 16 | 4 | 2021 | 4 | 2021 |
| WCM Enhancements: WCM Enhancements | 2 | 2018 | 4 | 2021 |
| WCM Enhancements: WCM 3 | 2 | 2018 | 2 | 2018 |
| WCM Enhancements: WCM 4 | 4 | 2018 | 4 | 2018 |
| WCM Enhancements: WCM 5 | 2 | 2018 | 2 | 2018 |
| WCM Enhancements: WCM 6 | 4 | 2019 | 4 | 2019 |
| WCM Enhancements: WCM 7 | 2 | 2020 | 2 | 2020 |
| WCM Enhancements: WCM 8 | 4 | 2020 | 4 | 2020 |
| WCM Enhancements: WCM 9 | 2 | 2018 | 2 | 2018 |
| WCM Enhancements: WCM 10 | 4 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| WCM Enhancements: WCM 11 | 2 | 2018 | 2 | 2018 |
| WCM Enhancements: WCM 12 | 4 | 2018 | 4 | 2018 |
| WCM Enhancements: WCM 13 | 2 | 2019 | 2 | 2019 |
| WCM Enhancements: WCM 14 | 4 | 2019 | 4 | 2019 |
| NMRS Advanced Analytics: NMRS Advanced Analytics | 1 | 2018 | 4 | 2019 |
| NMRS Advanced Analytics: NMRS 5 | 1 | 2018 | 1 | 2018 |
| NMRS Advanced Analytics: NMRS 6 | 4 | 2018 | 4 | 2018 |
| NMRS Advanced Analytics: NMRS 7 | 1 | 2018 | 1 | 2018 |
| NMRS Advanced Analytics: NMRS 8 | 4 | 2018 | 4 | 2018 |
| NMRS Advanced Analytics: NMRS 9 | 1 | 2019 | 1 | 2019 |
| NMRS Advanced Analytics: NMRS 10 | 4 | 2019 | 4 | 2019 |
| STAMPS Advanced Analytics (MPOT): STAMPS | 1 | 2018 | 3 | 2018 |
| Transformation MPT&E Core: Transformation MPT&E Core | 1 | 2018 | 4 | 2020 |
| Transformation MPT&E Core: Navy Standard Integrated Personnel System (NSIPS) 1 | 1 | 2018 | 1 | 2018 |
| Transformation MPT&E Core: NSIPS 2 | 4 | 2018 | 4 | 2018 |
| Transformation MPT&E Core: NSIPS 3 | 1 | 2019 | 1 | 2019 |
| Transformation MPT&E Core: NSIPS 4 | 4 | 2019 | 4 | 2019 |
| Transformation MPT&E Core: NSIPS 5 | 1 | 2020 | 1 | 2020 |
| Transformation MPT&E Core: NSIPS 6 | 4 | 2020 | 4 | 2020 |
| Transformation SPOE Single Point of Entry: Transformation SPOE | 3 | 2018 | 4 | 2020 |
| Transformation SPOE Single Point of Entry: My Navy Portal (MNP) 1 | 3 | 2018 | 3 | 2018 |
| Transformation SPOE Single Point of Entry: MNP 2 | 4 | 2018 | 4 | 2018 |
| Transformation SPOE Single Point of Entry: MNP 3 | 1 | 2018 | 1 | 2018 |
| Transformation SPOE Single Point of Entry: MNP 4 | 4 | 2018 | 4 | 2018 |
| Transformation SPOE Single Point of Entry: MNP 5 | 1 | 2019 | 1 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604703N / *Personnel, Trng, Sim, & Human Factors* | **Project (Number/Name)**<br>1822 / *Manpower Pers & Human Fact System* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Transformation SPOE Single Point of Entry: MNP 6 | 4 | 2019 | 4 | 2019 |
| Transformation SPOE Single Point of Entry: MNP 7 | 1 | 2020 | 1 | 2020 |
| Transformation SPOE Single Point of Entry: MNP 8 | 4 | 2020 | 4 | 2020 |
| Transformation SPOE Single Point of Entry: Peoplesoft 9,2 Proof of Concept 1 | 1 | 2018 | 1 | 2018 |
| Transformation SPOE Single Point of Entry: Proof of Concept 2 | 4 | 2018 | 4 | 2018 |
| Transformation SPOE Single Point of Entry: Proof of Concept 3 | 1 | 2019 | 1 | 2019 |
| Transformation SPOE Single Point of Entry: Proof of Concept 4 | 4 | 2019 | 4 | 2019 |
| Transformation SPOE Single Point of Entry: Proof of Concept 5 | 1 | 2020 | 1 | 2020 |
| Transformation SPOE Single Point of Entry: Proof of Concept 6 | 4 | 2020 | 4 | 2020 |
| Transformation SPOE Single Point of Entry: Transformation Platform as a Service (PaaS) 1 | 1 | 2018 | 1 | 2018 |
| Transformation SPOE Single Point of Entry: PaaS 2 | 4 | 2018 | 4 | 2018 |
| Transformation ADE Authoritative Data Environment: Transformation ADE Authoritative Data Environment | 1 | 2018 | 4 | 2020 |
| Transformation ADE Authoritative Data Environment: ADE 1 | 1 | 2018 | 1 | 2018 |
| Transformation ADE Authoritative Data Environment: ADE 2 | 4 | 2018 | 4 | 2018 |
| Transformation ADE Authoritative Data Environment: ADE 3 | 1 | 2019 | 1 | 2019 |
| Transformation ADE Authoritative Data Environment: ADE 4 | 4 | 2019 | 4 | 2019 |
| Transformation ADE Authoritative Data Environment: ADE 5 | 1 | 2020 | 1 | 2020 |
| Transformation ADE Authoritative Data Environment: ADE 6 | 4 | 2020 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604727N *I Joint Standoff Weapon Systems* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 63.677 | 89.741 | 87.761 | 40.170 | 3.005 | 1,202.659 |
| 2068: *Joint Standoff Weapon (JSOW)* | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 63.677 | 89.741 | 87.761 | 40.170 | 3.005 | 1,202.659 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 766 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

JSOW Extended Range (ER) development commences in FY 2020 providing a JSOW variant with powered flight, avionics upgrades, and improved software enabling operations at tactically significant ranges of greater than 200nm, to kinetically engage adversary surface combatants and land targets. Additionally, the JSOW ER capability fundamentally supports Navy's strategy of intelligent, Network Enabled Weapons in order to apply effective and lethal firepower from secure positions. The FY 2020 budget request supports Engineering, Manufacturing, and Development (EMD) phase beginning in FY 2020 and Initial Operational Capability (IOC) in FY 2025 for F/A-18E/F. This effort leverages demonstration funding from OSD in FY 2018 and FY 2019, transitioning capability to the Navy.

The Joint Standoff Weapon (JSOW) is an air-to-ground weapon designed to attack a variety of targets during day, night, and adverse weather conditions. JSOW will enhance aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch aircraft to standoff outside the range of most target area surface-to-air threat systems. The JSOW launch-and-leave capability will allow several target kills per aircraft sortie. The JSOW program first developed a baseline weapon for use against fixed area targets. JSOW is a Navy led joint Navy/Air Force program. JSOW utilizes a "common truck" for both AGM-154A and AGM-154C variants. Through adherence to international standards for weapons interfaces, weight, and dimension considerations, JSOW is compatible with Air Force and North Atlantic Treaty Organization aircraft.

The JSOW Unitary (AGM-154C-1) variant includes a Network Enabled Weapon moving maritime target capability. The AGM-154C-1 capability enables the weapon to be integrated with the network and attack sea moving maritime targets via real-time pre-and post-launch targeting updates. JSOW will continue to conduct analysis and development of solutions to system integration challenges, and continual enhancement of warfighter effectiveness in the employment of the JSOW weapon system. The FY 2019 funding included the integration of new functionality into the joint mission planning systems and precision guided munitions planning system. JSOW C-1 Initial Operational Capability was achieved in June 2016. JSOW C-1 Full Operational Capability was achieved in August 2017.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604727N *I Joint Standoff Weapon Systems* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.435 | 0.441 | 0.439 | - | 0.439 |
| Current President's Budget | 0.418 | 0.441 | 18.725 | - | 18.725 |
| Total Adjustments | -0.017 | 0.000 | 18.286 | - | 18.286 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.017 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 18.286 | - | 18.286 |

**Change Summary Explanation**

The FY 2020 funding request was increased to support the development of the ER configuration in conjunction with funded demonstration efforts.

The FY2020 funding request was reduced by $.218M to account for the availability of prior year execution balances.

Schedule:
Incorporate JSOW ER events.

Technical: N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604727N / *Joint Standoff Weapon Systems* | Project (Number/Name)<br>2068 / *Joint Standoff Weapon (JSOW)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2068: *Joint Standoff Weapon (JSOW)* | 898.721 | 0.418 | 0.441 | 18.725 | - | 18.725 | 63.677 | 89.741 | 87.761 | 40.170 | 3.005 | 1,202.659 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 766

**A. Mission Description and Budget Item Justification**

JSOW Extended Range (ER) development commences in FY 2020 providing a JSOW variant with powered flight, avionics upgrades, and improved software enabling operations at tactically significant ranges of greater than 200nm, to kinetically engage adversary surface combatants and land targets. Additionally, the JSOW ER capability fundamentally supports Navy's strategy of intelligent, Network Enabled Weapons in order to apply effective and lethal firepower from secure positions. The FY 2020 budget request supports Engineering, Manufacturing, and Development (EMD) phase beginning in FY 2020 and Initial Operational Capability (IOC) in FY 2025 for F/A-18E/F. This effort leverages demonstration funding from OSD in FY 2018 and FY 2019, transitioning capability to the Navy.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** JSOW-ER | 0.000 | 0.000 | 18.286 | 0.000 | 18.286 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** JSOW ER program development efforts include activities to support the development and incorporation of an Extended Range (ER) variant of the JSOW into the US Navy's operational inventory. | | | | | |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>The System Design and Development (SDD) phase will begin in FY 2020 to support the development of the JSOW ER<br>configuration, in conjunction with funded demonstration efforts, to conduct engineering support activities, and leverage<br>demonstration results to develop the JSOW ER design. Efforts include the SRR milestone review; system architecture and<br>design work and evaluation; hardware and software planning, integration, and qualification; and verification and validation of critical design attributes. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604727N / *Joint Standoff Weapon Systems* | **Project (Number/Name)**<br>2068 / *Joint Standoff Weapon (JSOW)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY 2020 funding request was increased to support the development of the Extended Range configuration in conjunction with funded demonstration efforts. | | | | | |
| ***Title:*** JSOW Mission Planning Systems | 0.418 | 0.441 | 0.439 | 0.000 | 0.439 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** JSOW program development efforts include new mission planning functionality required for Network Enabled Weapon (NEW) moving target capability for the JSOW-C-1.<br>***FY 2019 Plans:***<br>Continue interoperability efforts for JSOW C-1.<br>***FY 2020 Base Plans:***<br>Legacy JSOW C-1 efforts include JSOW baseline C-1 integration and interoperability path forward; continued network interoperability efforts for JSOW C-1; continue software improvement efforts; initiate efforts to migrate JSOW mission planning software from the contractor owned Common Weapon Planning Environment (CWPE) to the Government owned Precision Guidance Mission Planning System (PGMPS) common component.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2019 to FY 2020 decrease of $.002 is due to service miscellaneous. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.418 | 0.441 | 18.725 | 0.000 | 18.725 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • USN WP,N BLI 2230: *JSOW* | 5.487 | 1.330 | 0.000 | - | 0.000 | 0.000 | 64.300 | 85.100 | 122.800 | 261.228 | 2,810.006 |

**Remarks**

FY2020 - BLI 2230. No funding is required as Telemetry Instrumentation Kit (TIK) 2.0 component assembly certification will be complete.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604727N / *Joint Standoff Weapon Systems* | **Project (Number/Name)**<br>2068 / *Joint Standoff Weapon (JSOW)* |

**D. Acquisition Strategy**

The JSOW-ER acquisition strategy includes the development, integration, test, qualification and production of a moving maritime target (MMT), Stationary Land Target (SLT) and Relocatable Land Target (RLT) capability. This program will utilize the rapid acquisition interim approach Section 804 middle tier acquisition process to apply innovative technologies to rapidly develop and field the new JSOW-ER capability with separate cost, schedule, and performance measurements as an ACAT II program. The contracting strategy for JSOW line of weapons is planned to be sole source for the life of the program. JSOW-ER will use cost-type contracts to rapidly transition the already-prototyped Extended Range variant of the AGM-154 into a production configuration via the Middle Tier Acquisition framework. The schedule is phased to leverage the existing engineering team that conducted successful powered-flight demonstrations, and affordably transition of the production line from its current operations supporting foreign sales to domestic Extended Range quantities. Fixed-price contracts will be used for procurement.

**E. Performance Metrics**

Primary metrics for JSOW-ER will be program schedule, range, and unit cost.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604727N / *Joint Standoff Weapon Systems* | Project (Number/Name)<br>2068 / *Joint Standoff Weapon (JSOW)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JSOW System Engineering | MIPR | National Security Agency : Fort Meade, MD | 1.259 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.259 | - |
| JSOW Prior year Prod Dev no longer funded in the FYDP | Various | Various : Various | 802.617 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 802.617 | - |
| JSOW ER Product Development | SS/CPIF | Raytheon Missile Systems : Tucson, AZ | 0.000 | 0.000 | | 0.000 | | 13.046 | Mar 2020 | - | | 13.046 | 194.820 | 207.866 | 139.180 |
| | | **Subtotal** | 803.876 | 0.000 | | 0.000 | | 13.046 | | - | | 13.046 | 194.820 | 1,011.742 | N/A |

**Remarks**

Product development was added in support of JSOW-ER Integration.
Primary Hardware Development was added in support of JSOW-ER. Currently evaluating a pool of mature technical solutions for weapon warhead to select a final payload solution.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JSOW Software Development | SS/CPFF | Various : Various | 6.414 | 0.418 | Feb 2018 | 0.441 | Mar 2019 | 0.439 | Mar 2020 | - | | 0.439 | 4.816 | 12.528 | 12.526 |
| JSOW Prior year Support no longer funded in the FYDP | Various | Various : Various | 8.007 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.007 | - |
| JSOW ER Government Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 1.500 | Nov 2019 | - | | 1.500 | 15.000 | 16.500 | - |
| JSOW ER Government Support | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 3.000 | Nov 2019 | - | | 3.000 | 20.000 | 23.000 | - |
| | | **Subtotal** | 14.421 | 0.418 | | 0.441 | | 4.939 | | - | | 4.939 | 39.816 | 60.035 | N/A |

**Remarks**

Government support was added in support of JSOW-ER.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604727N / *Joint Standoff Weapon Systems* | Project (Number/Name)<br>2068 / *Joint Standoff Weapon (JSOW)* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JSOW Oper Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 20.886 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 20.000 | 40.886 | - |
| JSOW Prior year T&E no longer funded in the FYDP | WR | NAWCWD : China Lake, CA | 34.034 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 25.000 | 59.034 | - |
| | | **Subtotal** | 54.920 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 45.000 | 99.920 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JSOW Prior year Mgmt no longer funded in the FYDP | Various | Various : Various | 25.504 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.504 | - |
| JSOW ER Government Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.500 | Nov 2019 | - | | 0.500 | 2.000 | 2.500 | - |
| JSOW ER Project Management Support | C/CPFF | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.200 | Nov 2019 | - | | 0.200 | 2.000 | 2.200 | 2.200 |
| JSOW ER Travel | Various | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.040 | Nov 2019 | - | | 0.040 | 0.500 | 0.540 | - |
| | | **Subtotal** | 25.504 | 0.000 | | 0.000 | | 0.740 | | - | | 0.740 | 4.500 | 30.744 | N/A |

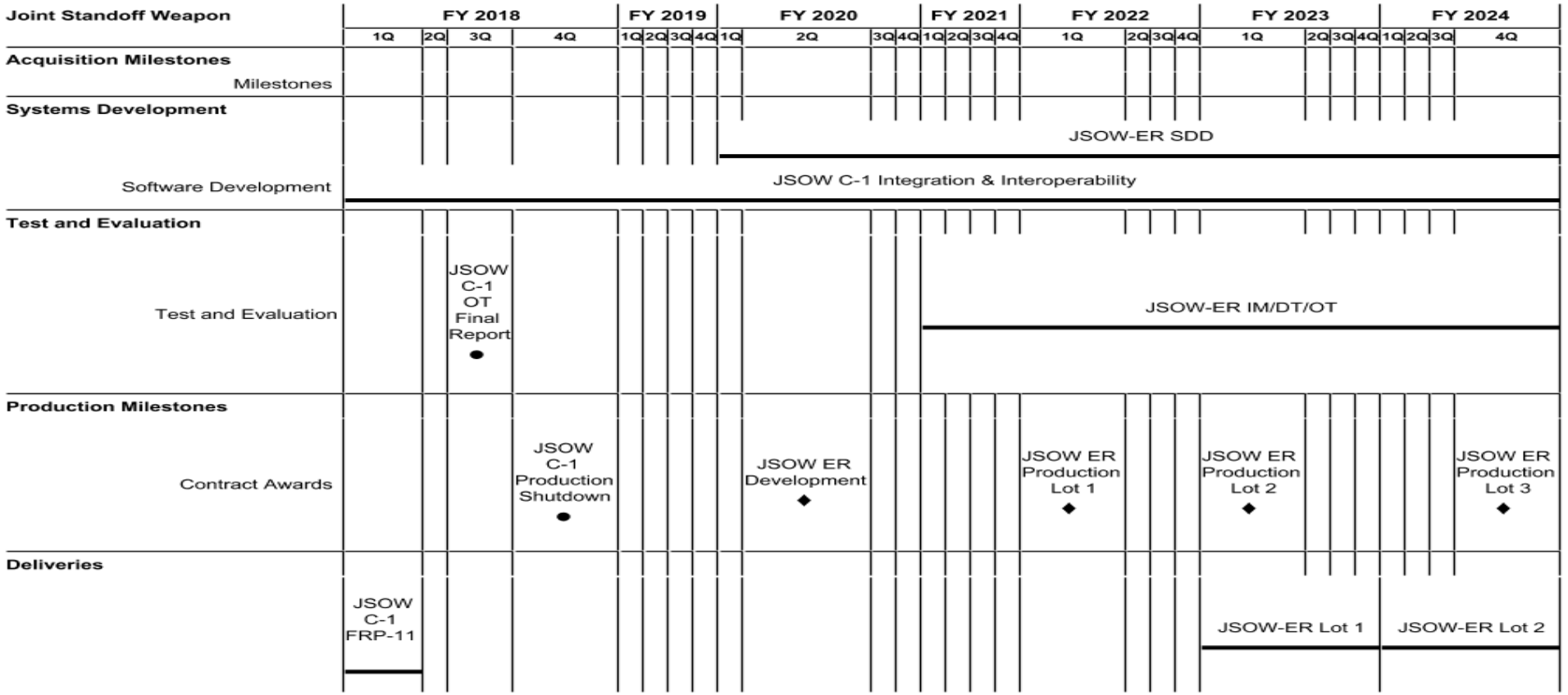
**Remarks**

Government Support, Project Management and Travel added in support of JSOW-ER.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 898.721 | 0.418 | | 0.441 | | 18.725 | | - | | 18.725 | 284.136 | 1,202.441 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604727N / *Joint Standoff Weapon Systems* | **Project (Number/Name)**<br>2068 / *Joint Standoff Weapon (JSOW)* |




*2020PB - 0604727N - 2068*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604727N / *Joint Standoff Weapon Systems* | **Project (Number/Name)**<br>2068 / *Joint Standoff Weapon (JSOW)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Joint Standoff Weapon*** | | | | |
| Systems Development: JSOW-ER System Design and Development | 1 | 2020 | 4 | 2024 |
| Systems Development: Software Development: JSOW C-1 Integration and Interoperability | 1 | 2018 | 4 | 2024 |
| Test and Evaluation: Test and Evaluation: AGM-154C-1 JSOW Operational Test Agency Follow-On Evaluation Report OT-IIIB Final Report | 3 | 2018 | 3 | 2018 |
| Test and Evaluation: Test and Evaluation: JSOW - ER Insensitive Munition Testing, Developmental Test and Operational Test | 1 | 2021 | 4 | 2024 |
| Production Milestones: Contract Awards: Production Shutdown Awards Phase 2 Raytheon (part 2) | 4 | 2018 | 4 | 2018 |
| Production Milestones: Contract Awards: JSOW ER Design and Development Award | 2 | 2020 | 2 | 2020 |
| Production Milestones: Contract Awards: Production Lot 1 Award | 1 | 2022 | 1 | 2022 |
| Production Milestones: Contract Awards: Production Lot 2 Award | 1 | 2023 | 1 | 2023 |
| Production Milestones: Contract Awards: Production Lot 3 Award | 4 | 2024 | 4 | 2024 |
| Deliveries: FRP-11 Deliveries- AGM-154C-1 | 1 | 2018 | 1 | 2018 |
| Deliveries: JSOW-ER Lot 1 Deliveries | 1 | 2023 | 4 | 2023 |
| Deliveries: JSOW-ER Lot 2 Deliveries | 1 | 2024 | 4 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604755N *I Ship Self Def (Detect & Cntrl)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,237.728 | 160.475 | 181.491 | 192.603 | 1.122 | 193.725 | 156.240 | 156.080 | 151.991 | 153.810 | Continuing | Continuing |
| 2178: *QRCC* | 1,181.357 | 145.093 | 169.668 | 181.971 | - | 181.971 | 138.951 | 139.723 | 137.329 | 140.081 | Continuing | Continuing |
| 3172: *Joint Non-Lethal Weapons* | 44.586 | 5.140 | 3.992 | 2.100 | 1.122 | 3.222 | 4.714 | 4.628 | 4.363 | 4.449 | Continuing | Continuing |
| 3358: *SSDS Training Improvement Program* | 11.785 | 7.347 | 7.831 | 8.532 | - | 8.532 | 12.575 | 11.729 | 10.299 | 9.280 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 2.895 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.895 |

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $6.214 million to account for the availability of prior year execution balances.

This program element provides Aircraft Carriers and Amphibious Class ships Ship Self Defense System (SSDS) MK2 Combat System upgrades and integrates new equipment and systems to pace the threat and capture advances in technology. Examples of captured advanced technologies are: open architecture, advanced information assurance and initial cyber defense, Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability Improvement Project (FTIIP), and advanced sensor integration all of which require corresponding SSDS MK2 changes. The program element also includes the integrated Combat System project for embedded shipboard training and the Non-Lethal weapons project in support of anti-terrorism/force protection missions.

QRCC project (PU 2178) - implements an evolutionary acquisition of improved ship self-defense capabilities against Anti-Ship Cruise Missiles (ASCMs), and improved multi-warfare capabilities, for Aircraft carriers and Amphibious Class ships. SSDS MK 2 integrates a diverse set of fire control loop sensors and weapons, and C4I systems for each ship class (CVN68/78, LHA6, LHD1, LPD17, and LSD41/49). SSDS MK2 provides combat direction, and joint interoperability via the Cooperative Engagement Capability (CEC) and Tactical Digital Information Link (TADL)-J. System design emphasizes commonality and a single source software library which are major mechanisms for cost control and avoidances. SSDS uses a physically distributed, open system architecture computer network consisting of common hardware such as the Common Processor System (CPS) and the Common Display System (CDS). SSDS MK2 implements new combat system war-fighting capabilities and improvements on phased basis via Advanced Capability Builds (ACB) and Technology Insertion (TI). PU 2178 efforts are divided into three major functional areas: SSDS Product Development, Combat Systems Integration, and Test and Evaluation/Certification.

Joint Non-Lethal Weapons (PU 3172) - provides a long range laser warning and dazzle system, maritime vessel stopper system, and combined effects (light, laser, and sound) system for use in the maritime environment. Optical warning and distraction has been identified by the services as a possible technology solution to mitigate and/or address several known joint non-lethal capability gaps.

SSDS Training Improvement Program (PU 3358) - provides enhancements and upgrades to the SSDS Total Ship Training Capability (TSTC) components within the combat system, combat system elements, Battle-Force Tactical Training (BFTT), and Advanced Training Domain (ATD) to address needs for increased training capability and functionality in conjunction with SSDS MK2 Advanced Capability Builds (ACB)/Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604755N *I Ship Self Def (Detect & Cntrl)* |

Improvement Project (FTIIP), Task Force Cyber Awakening (TFCA) Boundary Defense Capability (BDC), and Technical Insertion efforts under PU 2178 (QRCC). These enhancements will address current and future training requirements by implementing new functionality to enable the individual warfighter through distributed battle group events to engage in more complex training requirements to support fleet required training certification events. Capability Development and integration are related to Self Defense, Underwater, Surface, and other warfare areas. Capability enhancements and upgrades include development of re-useable common components that can be leveraged by SSDS MK2 combat systems, and/or integration of re-usable common components developed by the TSTC/BFTT Program and AEGIS Advanced Training Domain (ATD)/TSTC Total Ship Training Capability (TSTC) projects to meet AEGIS combat system training requirements. TSTC continues to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including COMPTUEX FST at Sea integration into Live, Virtual and Constructive (LVC) environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and SSDS combat system capability upgrades, and to address the Fleet's Live, Virtual and Constructive (LVC) Fleet Training Wholeness initiative. Additionally, modernization is needed to support the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan and Commander United States Fleet Forces Command Fleet Readiness Training Plan.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 161.713 | 180.391 | 199.685 | - | 199.685 |
| Current President's Budget | 160.475 | 181.491 | 192.603 | 1.122 | 193.725 |
| Total Adjustments | -1.238 | 1.100 | -7.082 | 1.122 | -5.960 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -4.239 | 0.000 | | | |
| • Program Adjustments | 0.000 | 1.100 | -4.718 | - | -4.718 |
| • Rate/Misc Adjustments | 0.001 | 0.000 | -2.364 | 1.122 | -1.242 |
| • Congressional Add Adjustments | 3.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *C2 Systems for Amphibs - Integrating CACS2 with SSDS* | 2.895 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 2.895 | 0.000 |
| Congressional Add Totals for all Projects | 2.895 | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604755N *I Ship Self Def (Detect & Cntrl)* |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $6.214 million to account for the availability of prior year execution balances.

The FY 2019 budget reflects a $1.100 million program adjustment for OCO in PU 3172, Joint Non-Lethal Weapons. FY 2019 OCO efforts include research and prototype development to determine a material solution to satisfy current Visual Augmentation Systems (VAS) capability gaps encountered during missions, including the ability to detect and recognize potential threat craft at the maximum possible range and at the earliest time in all-weather environments and the ability to record both audio/video encounters and incidents for after action reporting.

The FY 2020 budget request was adjusted to account for the reduction for availability of prior year execution and rate adjustments as well as increase in support of the Fleet Training Wholeness Strike Group CEC Training at Sea effort in PU 3358 and Visual Augmentation Systems (VAS) in PU 3172.

The investment to the Fleet Training Wholeness Strike Group CEC Training at Sea effort provides for the integration of the UPX-29 IFF simulation capability with the Cooperative Engagement Capability (CEC) as part of the Ship Self Defense System (SSDS) Integrated Combat System training capability. The UPX-29 IFF SIM provides Mode 5 simulation not available with the legacy Battle Force Tactical Training (BFTT) System.

The investment to the Visual Augmentation Systems (VAS) supports research, development, and testing of material solutions for VAS capability gaps encountered during missions in combat zones. Expeditionary force lacks the ability to detect and recognize potential threat craft at the maximum possible range and at the earliest time in all weather environments during day and night. In addition, the warfighter needs the ability to record both audio/video encounters and incidents for after action reporting.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2178: *QRCC* | 1,181.357 | 145.093 | 169.668 | 181.971 | - | 181.971 | 138.951 | 139.723 | 137.329 | 140.081 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The QRCC project (PU 2178) implements an evolutionary acquisition of improved ship self-defense capabilities against Anti-Ship Cruise Missiles (ASCMs), and improved multi-warfare capabilities, for Aircraft carriers and Amphibious Class ships. SSDS MK 2 integrates a diverse set of fire control loop sensors and weapons, and C4I systems for each ship class (CVN68/78, LHA6, LHD1, LPD17, and LSD41/49). SSDS MK2 provides combat direction, and joint interoperability via the Cooperative Engagement Capability (CEC) and Tactical Digital Information Link (TADL)-J. System design emphasizes commonality and a single source software library which are major mechanisms for cost control and avoidances. SSDS uses a physically distributed, open system architecture computer network consisting of common hardware such as the Common Processor System (CPS) and the Common Display System (CDS). SSDS MK2 implements new combat system war-fighting capabilities and improvements on phased basis via Advanced Capability Builds (ACB) and Technology Insertion (TI). PU 2178 efforts are divided into three major functional areas: SSDS Product Development, Combat Systems Integration, and Test and Evaluation/Certification.

SSDS Product Development encompasses systems engineering efforts, technology insertion and cyber-security, including the development and integration of ACB -12 and the required Technology Insertion TI12/12H (SSDS Software Build 10) and TI16 (SSDS Software Build 11) computing and display configurations. SSDS Product Development will provide warfighter upgrades including implementation of common software components for System Track Management; integration of CPS and CDS; expansion of SSDS MK 2 Local Area Network (LAN) to a Combat System LAN; integration of new Combat System/C4I elements (DBR, ESSM Block 1 with JUWL, SLQ-(V)6 SEWIP Block 2, MH-60R and CANES); implementation of cybersecurity boundary defense capabilities and Total Ship Training Capability (TSTC).

SW Build 10 is being fielded on the CVN 78, CVN 72 and LHD 2 currently undergoing Test Analyze and Fix (TAAF) in support of ship testing and certification. The SSDS design evolution also migrates ACB-12 to the TI-12H hardware configuration for initial installation on LHD 6 and TI-16 hardware configuration for initial installation on the CVN 73. SSDS ACB 20 and TI16 development will implement the required SSDS improvements to integrate the EASR/ERS, ESSM Block 2 and SEWIP softkill coordinator and includes system engineering, critical experiments, software development, operating environment, cyber-security software, hardware/software integration, factory qualification testing, land-based engineering testing, system/software TAAF effort in support of CS, logistics products and ashore training course development.

FY 2020 includes continuing the hardware design engineering, development and qualification for the next TI configurations, TI-16 Tech Refresh and TI-22.

For Cybersecurity, initiatives under PU 2178, will provide the SSDS MK 2 ICS protection and detection functionality and introduce critical response functionality to respond and recover from cyber-attacks. SSDS Cybersecurity is a phased multi-year development to define, develop, and integrate enterprise Combat System cybersecurity solutions which enhance the cybersecurity framework pillars of Identify, Protect, React, and Restore and expand force level cyber defense capabilities for the Carrier and Amphibious Fleet to provide a set of boundary defense capabilities for the SSDS MK2 ICS, a set of centralized Combat Systems-level cyber-security capabilities, and a set of element-level cyber-security protections.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

System engineering efforts for Joint Strike Fighter (JSF) F35B&C integration onboard LHA, LHD and CVN Class ships will provide improved F35 interoperability via Link 16 and improve land domain command and control for the Amphibious Readiness Group/Marine Air Ground Task Force (ARG/MAGTF) commanders and staffs through integration of USMC Common Aviation Command and Control System (CAC2S) program of record with LHA/D SSDS combat system.

Combat System Integration under PU 2178 encompasses CS modeling and simulation, system analysis/engineering, and system/software development for integration of sensors, weapons and C4I systems with SSDS MK2 in Aircraft Carrier and Amphibious Class Ships. Combat System Integration includes Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability Improvement Project (FTIIP), and ACB-20 war-fighting improvements, including the integration of EASR/ERS.

FCLIP Phase 2 will provide CIWS integration with CEC/SSDS MK2, ESSM 2T Uplink, RAM Block2 Multi-Target processing in the missile, SoS integration of RAM Block 2 Multi-Target Processing, NSSMS MK9 Multi-Target Discrimination & Reporting, and modeling and analysis to ensure optimization and alignment of capabilities into the CS end-to-end fire control loop.

FTIIP is the second phase of the corrective action plan for the resolution of the strike group interoperability issues. FTIIP includes implementation of Tactical Data Link (TDL) IFF Mode 5 identification capabilities, F/A-18 Digital Air Control (Phase 1) in support of F/A-18 and F-35 Joint Strike Fighter initial deployment, integration of the Shipboard Gridlock System/Automatic Correlation (SGS/AC) system into the SSDS MK2 TI-16 configuration, and implementation of other high priority software.

ACB-20 Combat System Integration provides fire control loop improvements beyond FCLIP Phase 2 for tracking, weapon scheduling and engagement control with ESSM Block 2 missile; SEWIP Block 2 soft kill coordinator, SEWIP Block 3 Electronic Attack.

Test and Evaluation/Certification under PU 2178 encompasses SSDS MK2 Development Test and Evaluation (DT&E) providing for comprehensive testing and certification of the integrated CS for the CVN 68, CVN 78, LPD 17, LHD1, LHA 6 and LSD41/49 ship classes. This includes Land-Based testing at Wallops Island and At-Sea testing for the lead ships for the new CS configurations, and Live Fire testing on the SDTS. The DT&E encompasses test planning, preparation, test conduct, data collection and analysis, and resolution and verification of deficiency corrections. The SSDS MK 2 T&E/Certification supports Integrated Combat System certification, the SSDS Test and Evaluation Master Plan (TEMP) execution and the Air Warfare Ship Self Defense CAPSTONE Enterprise TEMP execution which includes continuation of DT and FOT&E events for the CVN 78 SSDS MK 2 Mod 6C configuration with the DBR, SEWIP Block 2 ES, ESSM Block 1 with JUWL up-link, and RAM Block 2.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SSDS MK2 Product Development/Combat Systems Integration | 117.614 | 141.639 | 155.616 | 0.000 | 155.616 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>For FCLIP Phase 2/FTIIP/TFCA BDC<br>- Complete Mode 5 IFF development for Baseline 9. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Complete the software development for CIWS integration with CEC/SSDS MK2, ESSM 2T Up-Link, and NSSMS MK9 Multi-Target Discrimination and Reporting.<br>- Continue engineering and certification testing of FCLIP Phase 2 improved fire control loop improvements.<br>- Complete software development for IFF Mode 5 integration with SSDS MK2 Builds 9, 10 & 11.<br>- Initiate Test, Analyze and Fix period for FCLIP Ph 2 and FTIIP capabilities.<br>- Continue designing and developing TFCA Cybersecurity improvements to secure the combat system enclave.<br><br>For Build 10 (ACB-12/TI-12 and ACB-12/TI-12H)<br>- Provide TAAF and complete certifications to support LHD 6, CVN 72 and LHD 2 ship installations and CVN 78 developmental testing.<br><br>For Build 11 (ACB-12/TI-16)<br>- Complete software migration to TI-16.<br>- Complete testing and certification (integration and combat system level), provide required TAAF to support ship installations and deployments.<br><br>For SSDS MK2 ACB-20/EASR/ERS/TI-16<br>- Conduct source selection for new CSEA/SDA contract for the SSDS MK2 ICS development<br>- Continue government engineering and design activities in preparation for FY19 contract award.<br>-Conduct government led ACB 20 ICS System Functional Review (SFR).<br>-Commence SSDS ACB 20 software design and development efforts with CSEA.<br>-Conduct SSDS ACB20 SRR, SFR and PDR.<br><br>For Joint Strike Fighter F35B&C<br>- Initiate systems engineering analysis for LHA and LHD Class ships<br>- Initiate systems engineering analysis for the integration of JSF F35B&C with Link 16 and JSF F35B with CAC2S. | | | | | |
| ***FY 2020 Base Plans:***<br>For Build 10 (ACB-12/TI-12/TI-12H)<br>- Provide required TAAF to support CVN 78 developmental and operational test events and LHD 6, CVN 72 and LHD 2 installation and test events. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| For Build 11 (ACB-12/TI-16)<br>- Provide required TAAF, to support CVN 73 ship installation, test and certification.<br><br>For SSDS MK2 ACB-20/EASR/ERS/TI-16<br>- Conduct SSDS ACB-20 software design and development efforts with CSEA.<br>- Conduct SSDS ACB-20 Release 1 FSIT and FQT.<br>- Continue government ACB-20 integrated combat system integration engineering activities.<br><br>For Joint Strike Fighter F35B&C<br>- Continue systems and software engineering effort for integration of CAC2S with SSDS for LHA and LHD Class ships.<br>- Continue system engineering effort for the integration of SSDS and JSF F35B&C with Link 16.<br>- Continue systems and software engineering efforts for integration of CAC2S with SSDS for LHA and LHD ships.<br>- Continue SSDS software engineering effort for the integration of JSF F35B&C with Link 16.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase is required to continue F35B Integration engineering activities to integrate SSDS and CAC2S including execution of design reviews and interface developments as well as continuing to identify and develop solutions to counter Cyber vulnerabilities with the SSDS integrated combat system. | | | | | |
| ***Title:*** SSDS MK2 Development Test & Evaluation | 27.479 | 28.029 | 26.355 | 0.000 | 26.355 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>For LSD SSDS MK 2 Mod 5C<br>- Complete CSSQT on LSD46<br>- Conduct DT-III-I Phase 1 at ICSTF<br>- Conduct OT-III-I Phase 2 ET12 SDTS<br>- Conduct OT-III-I Phase 3 ET14 Lead Ship Event<br><br>For CVN78 SSDS MK2 Mod6C | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue Land-Based integration and engineering testing at WI and aboard ship for ICS software changes/ corrections for CVN78 DT/OT/ OPEVAL and deployment software deliveries. For the CVN 78, FY 17-FY20 requires collaborative Combat System efforts to support CSSQT and DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group interoperability through extensive, Integrated Combat System (ICS) testing and software updates post-PSA.<br>- Conduct Fire Control Loop risk reduction TRKEX/MSLEX on SDTS with DBR (MFR), CEC, SSDS MK2, SEWIP Block 2, ESSM and RAM Block2.<br>- Initiate DT/OT-III J Phase 3/ET09 MSLEX on SDTS.<br>- Conduct CST at WI for authorization OQE for ICS software package for CSSQT Phase 2.<br><br>For LHD6/LSD 46/LPD23/LPD24 SSDS MK2 MOD 2C3C/5C/ ACB-TI-12H<br>- Conduct CST at WI for authorization OQE for ICS software package for LHD6 SSDS Mod 3C ACB-12/TI-12H for CSLO. For FCLIP Phase 2/FTIIP/TFCA BDC<br>- Initiate land-based integration and engineering testing at WI.<br><br>For LSD 49/CVN 78/CVN 73 SSDS MK2 Mod 5C/6C/1E<br>- Conduct Baseline 11 Cyber Table Top (CTT) at JHU/APL to support Cybersecurity Phase 1-2 Testing; Cybersecurity Phase 4 Testing for ICS software package for Mod 5C at ICSTF and LSD 49 Cybersecurity Phase 5-6; Cybersecurity Phase 3 Testing Mod 1E and Mod 6C at WIETC. | | | | | |
| ***FY 2020 Base Plans:***<br>For CVN 78 SSDS MK2 Mod 6C<br>- Conduct CST at WI for authorization OQE for ICS software package for CSSQT Phase 2.<br>- Conduct CSSQT for CVN 78.<br>- Complete DT/OT-III J Phase 3/ET-09 MSLEX on SDTS<br>- Continue DTIII-J-Phase 3 on CVN 78.<br><br>For FCLIP Phase 2/FTIIP/TFCA BDC<br>- Initiate Sea-Based DT on SDTS<br>- Conduct CST at WI for authorization OQE for ICS software package for Baseline 9.<br><br>For LHD6/CVN73 SSDS MK2 Mod 3C/1E ACB-12/TI-12H | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Conduct CST at WI for authorization OQE for ICS software package for LHD6 SSDS Mod 3C ACB-12/TI-12H for CSLO.<br><br>For CVN 78 SSDS MK2 Mod 6C<br>- Conduct Cybersecurity Phase 4 Testing for ICS software package at ISCTF and Cybersecurity Phase 5-6 onboard CVN 78.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease reflected to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 145.093 | 169.668 | 181.971 | 0.000 | 181.971 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/ BLI 5231 (SSDS): *SSDS* | 68.569 | 88.950 | 90.260 | - | 90.260 | 95.944 | 92.320 | 97.059 | 99.012 | Continuing | Continuing |
| • RDTEN/0607658N: *Cooperative Engagement Capability* | 88.088 | 128.815 | 127.924 | - | 127.924 | 161.162 | 182.355 | 151.318 | 162.413 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

D. Acquisition Strategy

A sole source follow-on Cost Plus Incentive Fee (CPIF) Level of Effort (LOE) contract, N00024-14-C-5128, was awarded 18 December 2013 with a Period of Performance (PoP) from FY14-FY17 for the development, test, certification of SSDS MK2 (ACB 12/TI-12) for CVN78, CVN72, LHD2, and the software migration of ACB 12 to TI-12H/TI-16 for CVN 68, LHD 1, LPD 17 ship classes. This contract was extended to June 2020 and an additional extension to Q2 FY21 is planned to provide continued support of the SSDS MK 2 to complete the contract scope requirements for CVN and Amphibious ship Modernization ACB 12 on TI-12 and TI-12H (SSDS Software Build 10), and TI-16 (SSDS Software Build 11).

A new competitive contract for a SSDS Combat System Engineering Agent (CSEA)/Software Design Agent (SDA) is planned to be awarded in Q3 FY 2019 with a ten (10)-year PoP from FY19-FY29. This contract will provide support for the Aircraft Carrier and Amphibious Ship Class SSDS Combat System (CS) element development of ACB 20 (SSDS Software Build 12) and follow-on technology upgrades based on the evolution of the SSDS MK 2 Combat Systems ACB 12/TI-12/TI-12H/TI-16. The

current requirements include systems and software engineering support, development of engineering products to support combat system integration, configuration control, developmental test/operational test (DT/OT) support, training and logistics support, and field technical support for the SSDS ICS.

For SSDS MK2 TI-12H/TI-16 hardware, the SSDS program uses competitive build to specification production contracts, and leverages common enterprise COTS products for computing, storage, display, network, conversion, and cyber security.

**E. Performance Metrics**

Requirement Documents
- Capability Development Document (CDD) for Ship Self Defense System (SSDS) MK2 approved 19 December 2013.
- Test and Evaluation Master Plan (TEMP No. 1400) For Ship Self Defense System (SSDS) Revision C, 25 May 2018. During the approval cycle, DOT&E requested a major update to Rev. C to include cyber security T&E requirements.

Background
- SSDS MK1 OPEVAL was successfully completed June 1997 with a Milestone III approval in March 1998 - SSDS MK2 MOD 1 FOT&E was conducted on CVN 76 in 2005. All KPP thresholds were met. However, the system was assessed as not suitable and not effective by COMOPTEVFOR based on the identification of SSDS MK2 and Combat Systems deficiencies (24major, 37 minor deficiencies).

- SSDS MK 2 Mod 2 FOT&E was conducted in LPD 17-19 in 2007/2008. All KPPs thresholds were met and the system was assessed OPERATIONALLY EFFECTIVE and OPERATIONALLY SUITABLE by COMOPTEVFOR in the 12 Feb 2010 report. 10 major and minor deficiencies were identified against SSDS MK 2. (Also, major Warfare effects deficiencies were identified against the LPD 17 class Combat System).

- SSDS MK 2 Mod 3A FOT&E was conducted in LHD 8 in Feb 2010. All KPPs thresholds were met and the system was assessed OPERATIONALLY EFFECTIVE and OPERATIONALLY SUITABLE by COMOPTEVFOR in the 13 Dec 2010 report. 10 major deficiencies were identified against SSDS MK 2. (Also, major Warfare effects deficiencies were identified against the LHD 8 Combat System).

- SSDS MK2 FOT&E with ESSM and RAM Block 1 was conducted in the SDTS Oct-Dec 2011 as part of Enterprise Test - 03. Combat System (system-of-system) deficiencies identified during MSLEX with stressing targets has resulted in a phased corrective action plan, designated as Fire Control Loop Improvement Project (FCLIP). - SSDS MK2 FOT&E with RAM Block 2 DT&E was conducted in the SDTS Dec 2014 as part of Enterprise Test - O5 Phase 2. Low altitude, supersonic, maneuvering targets were successfully engaged with RAM Block 2 missiles. - Conducted Enterprise Test (ET) Event 5 and Event 6 against a wide array of subsonic and supersonic targets during live fire testing conducted against the Self Defense Test Ship (SDTS) and the USS America (LHA 6) to assess performance of the Integrated Combat System (ICS).

- April 2016, at the Navy's test facility at Point Mugu, CA, the SDTS LHA6-configured SSDSMK 2 integrated CS utilizing the Rolling Airframe Missile (RAM) Guided Missile Weapons System (comprised of the MK 49 Launcher and the Block 2 missile) successfully completed a live fire test by engaging and killing a pair of supersonic, maneuvering, sea-skimming targets designed to represent current anti-ship missile threats. The test event validated that significant progress has been made FCLIP program which was designed to improve coordination across all elements of the overall SSDS integrated CS. This test was the second successful integrated combat

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

systems firing event against this surrogate threat accomplished by the shipboard air search radars and surface to air missiles found on U.S. Navy Amphibious Class ships. The integrated CS is comprised of the SSDS Mk 2 Mod 4B, SPS-48, SPS-49, SPQ-9B, SLQ-32, Evolved Sea Sparrow Missile and RAM Block 2 missile. Status

- The Director, Operational Test and Evaluation (DOT&E) Annual Reports have identified ship self-defense mission deficiencies based on operational testing. The report is a compilation of multiple reports from Commander, Operational Test Force (COTF) including shipboard testing on the CVN 76, CVN 70, LPD 17, LPD 18, LPD 19, LHD 8; and enterprise testing on the SDTS and in the Probability of Raid Annihilation (PRA) test-bed. - SSDS was assessed Operationally Effective and Operationally Suitable for the LPD 17 Class and LHD 8. The Combat Systems (CVN, LPD, LHD) were assessed Not Operationally Effective against several Anti-Ship Cruise Missiles (ASCM). There are system of systems performance issues and design limitations. The issues are divided into four categories: detect, engage, test resources, and threat representation.

- All of the major training deficiencies have been addressed and are pending Verification of Correction of Deficiency (VCD) by COTF. Revised SSDS NTSP was signed 30 Jul 2012.
- OPNAV N96 is working with PEO IWS, DASN, and COTF to address the shortfalls in performance testing with the following initiatives:
a. Develop, test and field combat system improvements through the Fire Control Loop Improvement Project (FCLIP) Phase 1 with SSDS MK2 integration of: High Diver improvements to SPS-48E and CEC; SPQ-9B tracking improvements; North Atlantic Treaty Organization (NATO) Seasparrow Surface Missile System (NSSMS) MK 9 Target Illuminator improvements.
b. Integrate, test, and field SEWIP Block 2, and NULKA improvements.
c. Expand the use of Modeling and Simulation.
d. Develop FCLIP Phase 2 capabilities for RAM Block 2 Multi-Target processing, NSSMS MK9 TI Multi-Target discrimination and reporting, ESSM 2T Up-link and CIWS integration with CEC / SSDS MK2.
e. Consider follow on high return self-defense improvements with FCLIP and Advanced Capability Builds (ACB).

- Additional T&E and certification initiatives include:
a. Conduct element and platform level cyber-security testing using land based test site (LBTS) facilities.
b. Move away from platform centric certification testing towards baseline configuration centric testing for combat systems certification testing.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD - ACB12/TI12 / LSD - PSEA / SW Dev | SS/CPIF | RSC IDS (5128) : San Diego, CA | 121.808 | 8.006 | Dec 2017 | 18.433 | Dec 2019 | 17.198 | Jan 2020 | - | | 17.198 | Continuing | Continuing | Continuing |
| PD - ACB12/TI12 / LSD / AMIIP - PSEA / SW Dev | SS/CPAF | RSC IDS (5122) : San Diego, CA | 38.416 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 38.416 | - |
| PD - ACB12/TI12 / LSD - SE | SS/CPFF | JHU/APL : Laurel, MD | 73.144 | 1.250 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| PD - ACB12/TI12 / LSD - SW Dev/PL-STM | SS/CPAF | Gen. Dyn. (5100) : Fairfax, VA | 3.628 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.628 | - |
| PD - ACB12/TI12 / LSD - SE | WR | NSWC DD : Dalhgren, VA | 81.919 | 1.150 | Dec 2017 | 1.993 | Dec 2018 | 4.584 | Nov 2019 | - | | 4.584 | Continuing | Continuing | Continuing |
| PD - ACB12/TI12 / LSD - SE / ILS | WR | CDSA DN : Dam Neck, VA | 22.927 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| PD - ACB12/TI12 / LSD - SE&I/Force Pt | C/CPIF | RSC (IIS) : Suffolk, VA | 0.976 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.976 | - |
| PD - ACB12/TI12 / LSD - LBET/Training I | WR | NSWC PHD : Pt Hueneme, CA | 31.774 | 0.975 | Dec 2017 | 1.792 | Nov 2018 | 3.453 | Nov 2019 | - | | 3.453 | Continuing | Continuing | Continuing |
| PD - ACB12/TI12 / LSD - CVN78 LBET/Metrics/On-site Support | WR | NSWC Corona : Corona, CA | 1.148 | 0.125 | Nov 2017 | 0.200 | Nov 2018 | 0.432 | Nov 2019 | - | | 0.432 | 0.000 | 1.905 | - |
| PD - ACB12/TI12 / LSD -Navy Link Cert/Cross-Domain Spt | WR | SPAWAR : San Diego, CA | 0.435 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.435 | - |
| PD - ACB12/TI12 / LSD - Moriah Integration | WR | NAVAIR : Lakehurst, NJ | 0.309 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.309 | - |
| PD - ACB12/ CVN78 LBET w/DBR/RES | SS/CPIF | RSC IDS : Sudbury, MA | 5.080 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.080 | - |
| PD - ACB12/ CVN78 LBET w/CEC | SS/CPIF | RSC IDS : St. Petersburg, FL | 1.275 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.275 | - |
| PD - ACB12/ CVN78 LBET w/TPX-42 | WR | NAVAIR : St. Indigoes, MD | 0.111 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.111 | - |
| PD - ACB12/TI-16/TI12H - HW Dev / ILS / EDM Proc (DN) | WR | CDSA DN : Dam Neck, VA | 11.451 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD - ACB12/TI-16/TI12H - HW Eng | WR | NSWC DD : Dalhgren, VA | 10.183 | 2.480 | Dec 2017 | 0.000 | | 0.834 | Nov 2019 | - | | 0.834 | Continuing | Continuing | Continuing |
| PD - ACB12/TI-16/TI12H - SW Migration PSEA | SS/CPIF | RSC IDS (5128) : San Diego, CA | 23.371 | 26.232 | Dec 2017 | 0.000 | | 5.753 | Dec 2019 | - | | 5.753 | Continuing | Continuing | Continuing |
| PD - ACB12/TI-16/TI12H - SE | SS/CPFF | JHU/APL : Laurel, MD | 1.486 | 2.000 | Dec 2017 | 0.000 | | 0.632 | Dec 2019 | - | | 0.632 | 0.000 | 4.118 | - |
| PD - ACB12/TI-16/TI12H - LBET/Training Course Development | WR | NSWC-PHD : Pt Hueneme, CA | 0.575 | 2.000 | Nov 2017 | 0.000 | | 1.082 | Nov 2019 | - | | 1.082 | Continuing | Continuing | Continuing |
| PD - ACB12/TI-16/TI12H - Metrics/On-Site Sprt | WR | NSWC Corona : Corona, CA | 0.669 | 0.418 | Nov 2017 | 0.000 | | 0.457 | Nov 2019 | - | | 0.457 | 0.000 | 1.544 | - |
| PD - ACB12/TI-16/TI12H - CPS Engnr | C/IDIQ | GTS : Virginia Beach, VA | 0.042 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.042 | - |
| PD - ACB12/TI-16/TI12H - Navy Link Cert/Cross-Domain Sprt | WR | SPAWAR : San Diego, CA | 0.000 | 0.326 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.326 | - |
| PD - Cyber Resiliency / BDC PSEA SW DEV'T | SS/CPIF | RSC IDS (5128) : San Diego, CA | 6.131 | 3.421 | Dec 2017 | 1.000 | Dec 2018 | 0.932 | Dec 2019 | - | | 0.932 | Continuing | Continuing | Continuing |
| PD - Cyber Resiliency / BDC REQT & ENG | SS/CPFF | JHU/APL : Laurel, MD | 1.237 | 1.213 | Dec 2017 | 2.050 | Dec 2018 | 3.257 | Dec 2019 | - | | 3.257 | Continuing | Continuing | Continuing |
| PD - Cyber Resiliency / BDC SE | WR | NSWC-DD : Dalhgren, VA | 2.724 | 1.422 | Nov 2017 | 0.000 | | 0.932 | Nov 2019 | - | | 0.932 | Continuing | Continuing | Continuing |
| PD - Cyber Resiliency / BDC HW EDM | WR | CDSA DN : Dam Neck, VA | 0.864 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| PD - Cyber Resiliency / BDC CSTK DEV'T | C/CPIF | Progeny Systems Corp : Manassas, VA | 0.181 | 0.712 | Jun 2018 | 3.500 | Dec 2018 | 3.932 | Jan 2020 | - | | 3.932 | Continuing | Continuing | Continuing |
| PD - Cyber Resiliency / BDC NETWORK TOPOLGY | WR | G2OPS : Washington DC | 0.207 | 0.000 | Nov 2017 | 0.667 | Nov 2018 | 0.632 | Dec 2019 | - | | 0.632 | 0.000 | 1.506 | - |
| PD - Cyber Resiliency / BDC ILS | WR | NSWC PHD : Port Hueneme, CA | 0.657 | 0.450 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.107 | - |
| PD - Cyber Resiliency / BDC MODELING | WR | NSWCPD : Philadelphia, PA | 0.000 | 0.125 | May 2018 | 0.125 | Nov 2018 | 0.125 | Nov 2019 | - | | 0.125 | 0.000 | 0.375 | - |

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| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

**Product Development ($ in Millions)**

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD - Cyber Resiliency / BDC SEIT | C/CPIF | Gryphon/DELTA : Washington DC | 0.000 | 0.550 | Dec 2017 | 0.550 | Dec 2018 | 0.632 | Dec 2019 | - | | 0.632 | 0.000 | 1.732 | - |
| PD - Cyber Resiliency / BDC CSEA | C/CPAF | CSEA Contract : TBD | 0.000 | 0.000 | | 4.000 | Jun 2019 | 17.932 | Oct 2019 | - | | 17.932 | 0.000 | 21.932 | - |
| PD - TI-16TR/TI22 - HW Engineering | C/CPFF | Gryphon : Washington DC | 0.000 | 0.000 | | 0.000 | | 0.682 | Dec 2019 | - | | 0.682 | 0.000 | 0.682 | - |
| PD - TI-16TR/TI22 -HW Engineering | WR | NSWC-DD : Dalhgren, VA | 0.100 | 0.920 | Nov 2017 | 5.383 | Nov 2018 | 9.286 | Nov 2019 | - | | 9.286 | 0.000 | 15.689 | - |
| PD - HQ Travel | Various | PEO IWS : Washington DC | 0.370 | 0.150 | Nov 2017 | 0.150 | Nov 2018 | 0.175 | Oct 2019 | - | | 0.175 | Continuing | Continuing | Continuing |
| PD - SE/Dev/Integrate | SS/CPAF | Rayth(5412) (RIDS) : Portsmouth, RI | 83.451 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 83.451 | - |
| PD - F35B Integration / LHA / LHD | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 8.462 | Dec 2018 | 0.932 | Dec 2019 | - | | 0.932 | 0.000 | 9.394 | - |
| PD - F35B Integration / LHA / LHD | WR | NSWC DD : Dalhgren, VA | 0.000 | 0.000 | | 7.692 | Nov 2018 | 3.932 | Nov 2019 | - | | 3.932 | 0.000 | 11.624 | - |
| PD - F35B Integration / LHA / LHD | C/CPIF | SEI&T : Washington DC | 0.000 | 0.000 | | 3.846 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 3.846 | - |
| PD - F35B/C - ICS Link 16 Integration | C/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 1.100 | Dec 2018 | 1.182 | Dec 2019 | - | | 1.182 | 0.000 | 2.282 | - |
| PD - F35B Integration / LHA / LHD | TBD | PEO LS : Quantico, VA | 0.000 | 0.000 | | 0.000 | | 8.431 | Dec 2019 | - | | 8.431 | 0.000 | 8.431 | - |
| PD - F35B/C - ICS Link 16 Integration | WR | NSWC DD : Dalhgren, VA | 0.000 | 0.000 | | 1.000 | Nov 2018 | 1.931 | Nov 2019 | - | | 1.931 | 0.000 | 2.931 | - |
| PD - F35B Integration / LHA / LHD | C/CPIF | CSEA : TBD | 0.000 | 0.000 | | 0.000 | | 6.181 | Oct 2019 | - | | 6.181 | 0.000 | 6.181 | - |
| PD - F35B/C - ICS Link 16 Integration | C/CPIF | SEI&T : Washington DC | 0.000 | 0.000 | | 0.500 | Dec 2018 | 0.682 | Dec 2019 | - | | 0.682 | 0.000 | 1.182 | - |
| PD - F35B Integration / LHA / LHD | TBD | PEO C4I : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 5.181 | Dec 2019 | - | | 5.181 | 0.000 | 5.181 | - |
| PD - Misc - Prior Year Cum Cost | C/BA | Misc : Washington DC | 278.994 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 278.994 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

**Product Development ($ in Millions)**

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD - PM Prod Development | C/CPIF | various : various | 33.586 | 2.943 | Dec 2017 | 3.000 | Dec 2018 | 2.994 | Dec 2019 | - | | 2.994 | 0.000 | 42.523 | - |
| CSI - ACB20 (Less EASR) - SE | WR | NSWC COR : Corona, CA | 0.000 | 0.000 | | 0.450 | Nov 2018 | 0.557 | Nov 2019 | - | | 0.557 | 0.000 | 1.007 | - |
| CSI - ACB20 (Less EASR) - SE | WR | NSWC DD : Dalhgren, VA | 0.000 | 5.520 | Nov 2017 | 6.399 | Nov 2018 | 3.750 | Nov 2019 | - | | 3.750 | 0.000 | 15.669 | - |
| CSI - ACB20 (Less EASR) - SE | WR | NSWC PHD : Port Huneme, CA | 0.000 | 0.323 | Nov 2017 | 1.250 | Nov 2018 | 1.432 | Nov 2019 | - | | 1.432 | 0.000 | 3.005 | - |
| CSI - ACB20 (Less EASR) - SE | WR | NUWC KP : Keyport, WA | 0.000 | 0.161 | Nov 2017 | 0.175 | Nov 2018 | 0.200 | Nov 2019 | - | | 0.200 | 0.000 | 0.536 | - |
| CSI - ACB20 (Less EASR) - SE | SS/CPAF | Rayth (RIDS) : Portsmouth, RI | 0.000 | 1.075 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.075 | - |
| CSI - ACB20 (Less EASR) - SEI&T | C/CPFF | Gryphon : Washington DC | 0.000 | 3.062 | Dec 2017 | 2.233 | Dec 2018 | 1.956 | Dec 2019 | - | | 1.956 | 0.000 | 7.251 | - |
| CSI - ACB20 (Less EASR) - SE | SS/CPFF | JHU/APL : Laurel, MD | 0.000 | 5.458 | Dec 2017 | 5.906 | Dec 2018 | 3.082 | Dec 2019 | - | | 3.082 | 0.000 | 14.446 | - |
| CSI - ACB20 (Less EASR) - SE | C/CPAF | CSEA Contract : TBD | 0.000 | 0.000 | | 11.935 | Jun 2019 | 15.428 | Oct 2019 | - | | 15.428 | 0.000 | 27.363 | - |
| CSI - FCLIP Phase 2 - PSEA | SS/CPIF | RSC IDS (5128) : San Diego, CA | 12.197 | 7.527 | Dec 2017 | 5.370 | Dec 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE | SS/CPFF | JHU/APL : Laurel, MD | 9.460 | 2.258 | Dec 2017 | 1.598 | Nov 2018 | 0.606 | Dec 2019 | - | | 0.606 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE | WR | NSWC-DD : Dahlgren, VA | 1.697 | 0.724 | Nov 2017 | 1.016 | Nov 2018 | 0.245 | Nov 2019 | - | | 0.245 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE | WR | CDSA DN : Dam Neck, VA | 0.125 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.125 | - |
| CSI - FCLIP Phase 2 - SE | WR | NSWC PHD : Pt Hueneme, CA | 0.406 | 0.452 | Nov 2017 | 1.308 | Nov 2018 | 1.052 | Nov 2019 | - | | 1.052 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE / Planning | C/CPIF | Delta Resources : Alexandria, VA | 0.339 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.339 | - |
| CSI - FCLIP Phase 2 - SE & I | C/CPIF | RSC IIS (4112) : Suffolk, VA | 2.136 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSI - FCLIP Phase 2 - SEI&T | C/CPFF | Gryphon/Delta : Washington DC | 0.527 | 0.951 | Dec 2017 | 2.019 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 3.497 | - |
| CSI - FCLIP Phase 2 - SE Multi-Link Antenna | TBD | IWS 5 : TBD | 0.250 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| CSI - FCLIP Phase 2 - SE RAM/ESSM | WR | NAWC : China Lake | 1.897 | 0.591 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE RAM/CIWS | SS/CPFF | RSC(5432/5410) : Tucson, AZ | 1.080 | 1.882 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE | WR | NSWC : Crane, IN | 0.250 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - FCLIP Phase 2 - SE | WR | NSWC COR : Corona, CA | 0.000 | 0.000 | | 0.252 | Nov 2018 | 0.244 | Nov 2019 | - | | 0.244 | 0.000 | 0.496 | - |
| CSI - FCLIP Phase 2 - SE / SW Dev | SS/CPAF | Rayth (RIDS) : Portsmouth, RI | 7.552 | 2.903 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.455 | - |
| CSI - FCLIP Phase 2 - SE | WR | NUWC KP : Keyport, WA | 0.200 | 0.269 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.469 | - |
| CSI - FTIIP - PSEA - SW Dev | SS/CPIF | RSC IDS (5128) : San Diego, CA | 3.044 | 7.429 | Dec 2017 | 6.461 | Dec 2018 | 2.241 | Dec 2019 | - | | 2.241 | Continuing | Continuing | Continuing |
| CSI - FTIIP - SE | C/BA | JHU/APL : Laurel, MD | 0.151 | 0.300 | Nov 2017 | 0.580 | Nov 2018 | 0.431 | Dec 2019 | - | | 0.431 | 0.000 | 1.462 | - |
| CSI - FTIIP - SE | WR | NSWC-DD : Dahlgren, VA | 1.077 | 3.602 | Nov 2017 | 1.489 | Nov 2018 | 1.156 | Nov 2019 | - | | 1.156 | Continuing | Continuing | Continuing |
| CSI - FTIIP - SE | WR | CDSA DN : Dam Neck, VA | 0.616 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - FTIIP - SE&I | C/CPIF | RSC IIS (4112) : Suffolk, VA | 0.495 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - FTIIP - SE | WR | NSWC PHD : Port Hueneme, CA | 0.000 | 0.215 | Nov 2017 | 0.000 | | 0.456 | Nov 2019 | - | | 0.456 | 0.000 | 0.671 | - |
| CSI - FTIIP - SEI&T | C/CPFF | Gryphon : Washington DC | 0.731 | 1.004 | Dec 2017 | 1.830 | Dec 2018 | 1.447 | Dec 2019 | - | | 1.447 | 0.000 | 5.012 | - |
| CSI - FTIIP - SE | WR | NUWC KP : Keyport, WA | 0.186 | 0.000 | | 0.200 | Nov 2018 | 0.225 | Nov 2019 | - | | 0.225 | 0.000 | 0.611 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSI - ICS SE - PSEA SE | SS/CPIF | RSC IDS (5128) : San Diego, CA | 1.139 | 0.215 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.354 | - |
| CSI - ICS SE - SE&I | C/CPIF | RSC (IIS) : Suffolk, VA | 2.404 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - ICS SE - SEA 05C | C/BA | SEA 05C : Washington DC | 0.402 | 0.215 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.617 | - |
| CSI - ICS SE - SEI&T | C/CPFF | Gryphon : Washington DC | 1.427 | 1.222 | Nov 2017 | 2.817 | Nov 2018 | 2.282 | Dec 2019 | - | | 2.282 | 0.000 | 7.748 | - |
| CSI - ICS SE | SS/CPFF | JHU/APL : Laurel, MD | 4.274 | 1.450 | Dec 2017 | 1.448 | Dec 2018 | 1.581 | Dec 2019 | - | | 1.581 | Continuing | Continuing | Continuing |
| CSI - ICS SE | WR | NSWC DD : Dalhgren, VA | 3.907 | 1.669 | Nov 2017 | 1.635 | Nov 2018 | 1.677 | Nov 2019 | - | | 1.677 | Continuing | Continuing | Continuing |
| CSI - ICS SE | WR | CDSA DN : Dam Neck, VA | 0.515 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| CSI - ICS SE | WR | NUWC KP : Keyport, WA | 0.403 | 0.269 | Nov 2017 | 0.225 | Nov 2018 | 0.186 | Nov 2019 | - | | 0.186 | 0.000 | 1.083 | - |
| CSI - ICS SE | C/CPIF | Delta Resources : Virginia Beach, VA | 0.205 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.205 | - |
| CSI - ICS SE | FFRDC | MITRE : McLean, VA | 0.300 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| CSI - ICS SE | C/CPAF | CSEA Contract : TBD | 0.000 | 0.000 | | 0.500 | Jun 2019 | 0.431 | Oct 2019 | - | | 0.431 | 0.000 | 0.931 | - |
| CSI - EASR / ESS SE | SS/CPFF | JHU/APL : Laurel, MD | 1.817 | 3.575 | Dec 2017 | 1.648 | Dec 2018 | 0.882 | Dec 2019 | - | | 0.882 | Continuing | Continuing | Continuing |
| CSI - EASR / ESS SE | WR | NSWC DD : Dalhgren, VA | 1.718 | 2.970 | Nov 2017 | 4.371 | Nov 2018 | 1.766 | Nov 2019 | - | | 1.766 | Continuing | Continuing | Continuing |
| CSI - EASR / ESS / SEI&T | C/CPFF | Gryphon : Washington DC | 1.896 | 2.344 | Nov 2017 | 3.296 | Nov 2018 | 1.538 | Dec 2019 | - | | 1.538 | 0.000 | 9.074 | - |
| CSI - EASR / ESS SE | WR | CDSA DN : Dam Neck, VA | 0.273 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.273 | - |
| CSI - EASR / ESS SE | C/CPAF | RSC (5202) : St. Pete, FL | 0.246 | 0.788 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.034 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSI - EASR / ERS SE | WR | NSWC PHD : Port Huneme, CA | 0.000 | 0.323 | Nov 2017 | 0.685 | Nov 2018 | 0.277 | Nov 2019 | - | | 0.277 | 0.000 | 1.285 | - |
| CSI - EASR / ERS SE | C/CPAF | CSEA Contract : TBD | 0.000 | 0.000 | | 9.100 | Jun 2019 | 6.100 | Oct 2019 | - | | 6.100 | 0.000 | 15.200 | - |
| | | **Subtotal** | 904.571 | 117.614 | | 141.639 | | 155.616 | | - | | 155.616 | Continuing | Continuing | N/A |

**Remarks**

- For ACB12/TI12(CVN 78), FY 2019-FY 2020 includes collaborative SSDS and ICS maturation efforts through the test, analyze and fix process to support DT/OT/OPEVAL and achieve requisite deployment capabilities for Ship Self Defense and Strike Group Interoperability though extensive integrated testing and software updates. - In FY 2019, a new contract will be awarded on a competitive basis for a Combat System Engineering Agent/Software Design Agent (CSEA/SDA) for development of SSDS ACB20 and follow baselines.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT&E (PHD) | WR | NSWC PHD : Port Hueneme, CA | 105.000 | 5.286 | Nov 2017 | 6.029 | Nov 2018 | 5.816 | Nov 2019 | - | | 5.816 | Continuing | Continuing | Continuing |
| DT&E (SCSC-WI) | WR | SCSC-WI : Wallops Is, VA | 73.510 | 6.954 | Nov 2017 | 7.450 | Nov 2018 | 7.592 | Nov 2019 | - | | 7.592 | Continuing | Continuing | Continuing |
| DT&E (JHU/APL) | SS/CPFF | JHU/APL : Laurel, MD | 25.287 | 2.929 | Dec 2017 | 3.356 | Dec 2018 | 2.517 | Dec 2019 | - | | 2.517 | Continuing | Continuing | Continuing |
| DT&E (Corona) | WR | NSWC Corona : Corona, CA | 14.488 | 2.959 | Nov 2017 | 2.603 | Nov 2018 | 2.450 | Nov 2019 | - | | 2.450 | Continuing | Continuing | Continuing |
| DT&E (RAM/CIWS// ESSM) (RSC) | SS/CPFF | RSC(5432/5410) : Tucson, AZ | 4.100 | 0.424 | Nov 2017 | 0.404 | Nov 2018 | 0.250 | Dec 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| DT&E/CST (DD - CST) | WR | NSWC DD : Dahlgren, VA | 26.315 | 6.404 | Nov 2017 | 5.352 | Nov 2018 | 5.240 | Nov 2019 | - | | 5.240 | Continuing | Continuing | Continuing |
| DT&E (COTF) | WR | OPTEVFOR : Norfolk, VA | 5.834 | 1.231 | Nov 2017 | 1.243 | Nov 2018 | 1.172 | Nov 2019 | - | | 1.172 | Continuing | Continuing | Continuing |
| DT&E (CDSA-DN) | WR | CDSA DN : Dam Neck, VA | 4.656 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>2178 / *QRCC* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DT&E (engility) | C/CPIF | Engility : Virginia Beach, VA | 3.037 | 1.292 | Dec 2017 | 1.592 | Dec 2018 | 1.318 | Dec 2019 | - | | 1.318 | 0.000 | 7.239 | - |
| DT&E (SPAWAR-SD) | WR | SPAWAR : San Diego, CA | 5.780 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.780 | - |
| DT&E (Raytheon - St. Pete) | SS/CPAF | RSC (5202) : St. Pete, FL | 4.708 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DT&E (RAM/ESSM) (China Lake) | WR | NAWC : China Lake, CA | 1.150 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| DT&E (Raytheon - SE&I) | C/CPIF | Rayth - IIS : Suffolk, Va. | 0.571 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.571 | - |
| DT&E Raytheon - PSEA | SS/CPIF | RSC (5128) : San Diego, CA | 0.182 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.182 | - |
| DT&E (GD/AIS - IWS 1.0) | SS/CPAF | GD/AIS : Fairfax Va. | 0.266 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.266 | - |
| DT&E (Raytheon - RIDS) | SS/CPAF | RSC (5412) : Portsmouth, RI | 1.902 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 276.786 | 27.479 | | 28.029 | | 26.355 | | - | | 26.355 | Continuing | Continuing | N/A |

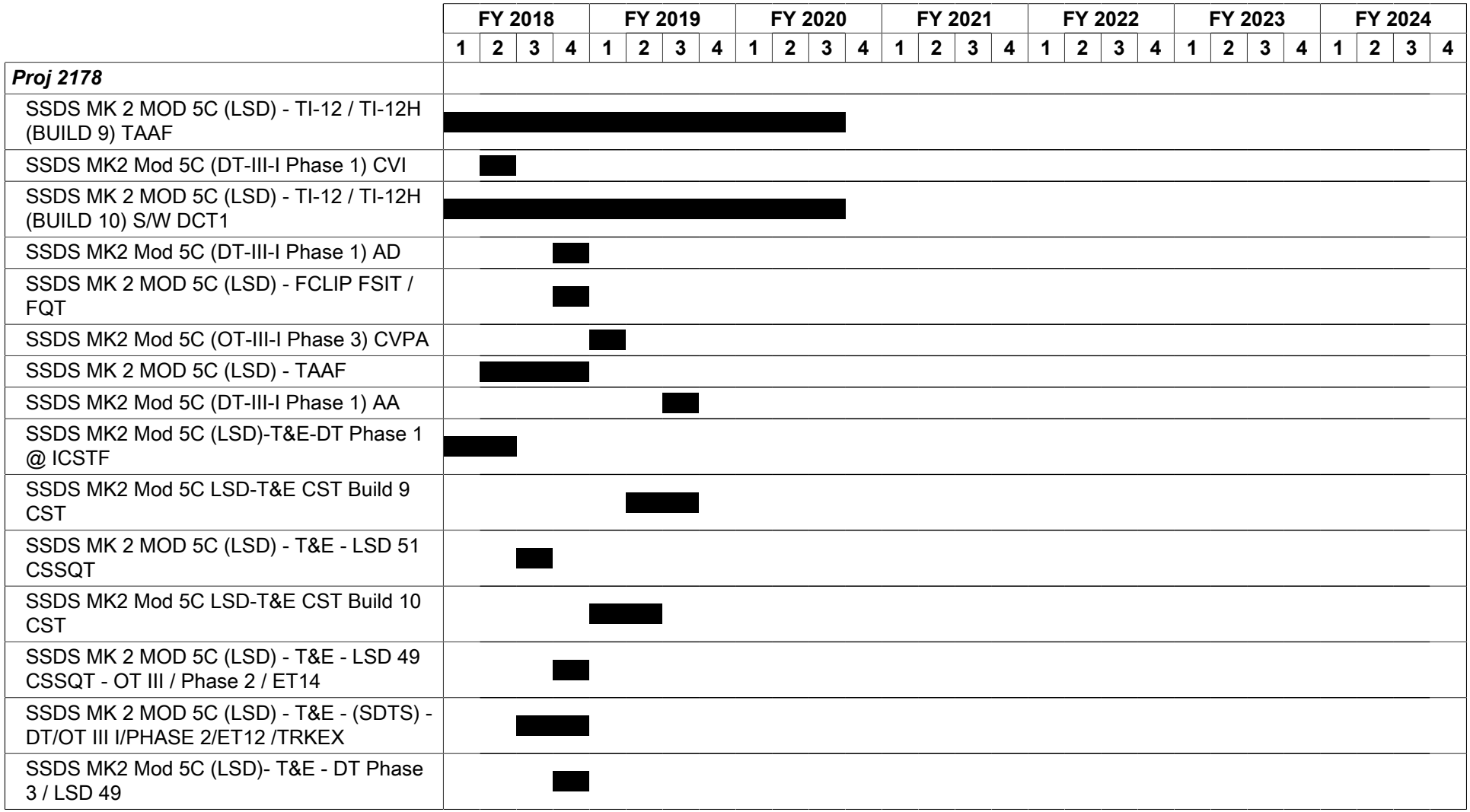
**Remarks**

- Accomplishment of SSDS MK2 CS integration and certification testing for ship system installation and deployment; - Accomplishment of the CVN78 CSSQT and SSDS MK2 ACB-12/TI-12 integrated CS test and evaluation (At-Sea aboard CVN78 and aboard the Self Defense Test Ship (SDTS).

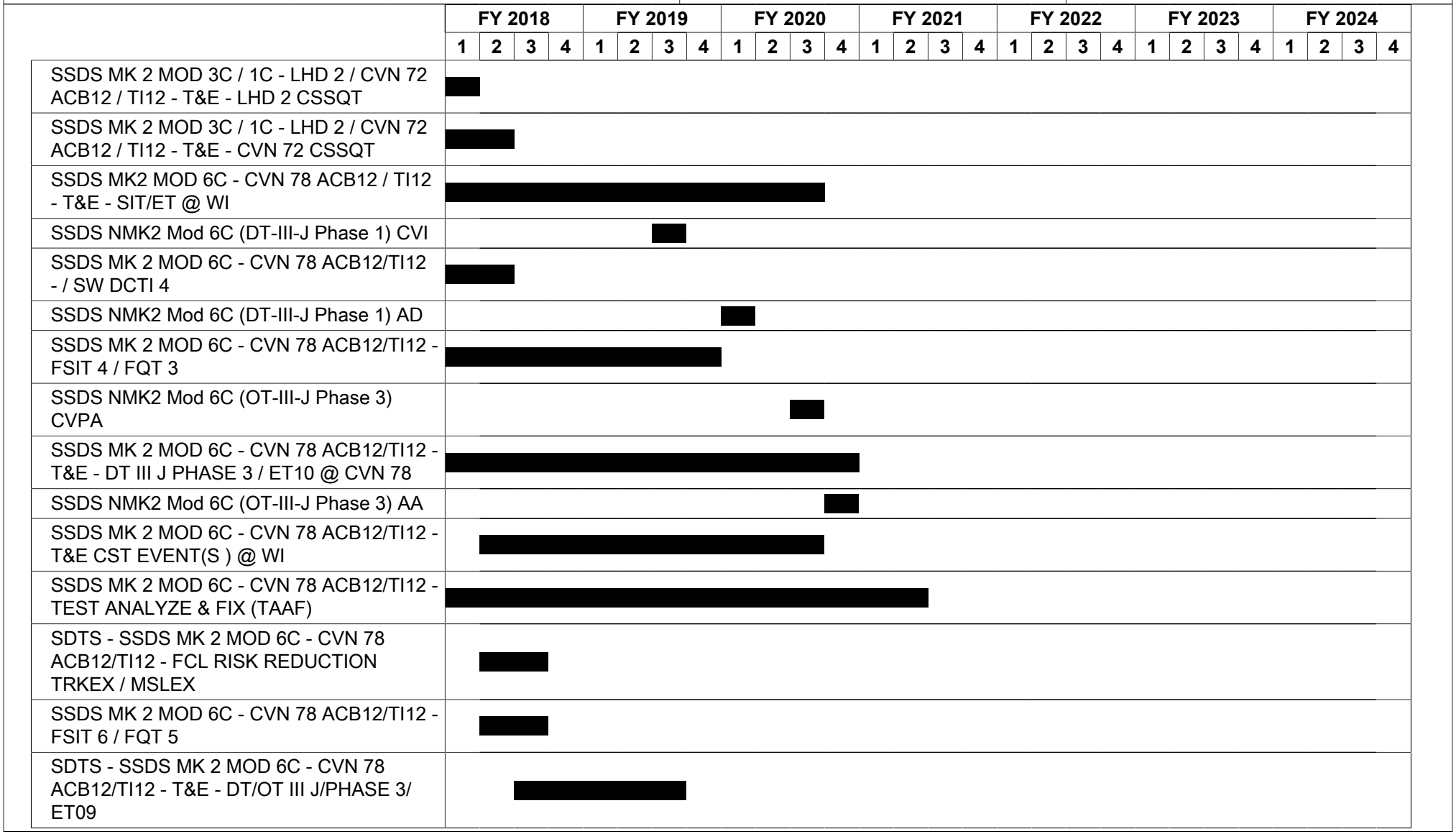
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,181.357 | 145.093 | | 169.668 | | 181.971 | | - | | 181.971 | Continuing | Continuing | N/A |

**Remarks**

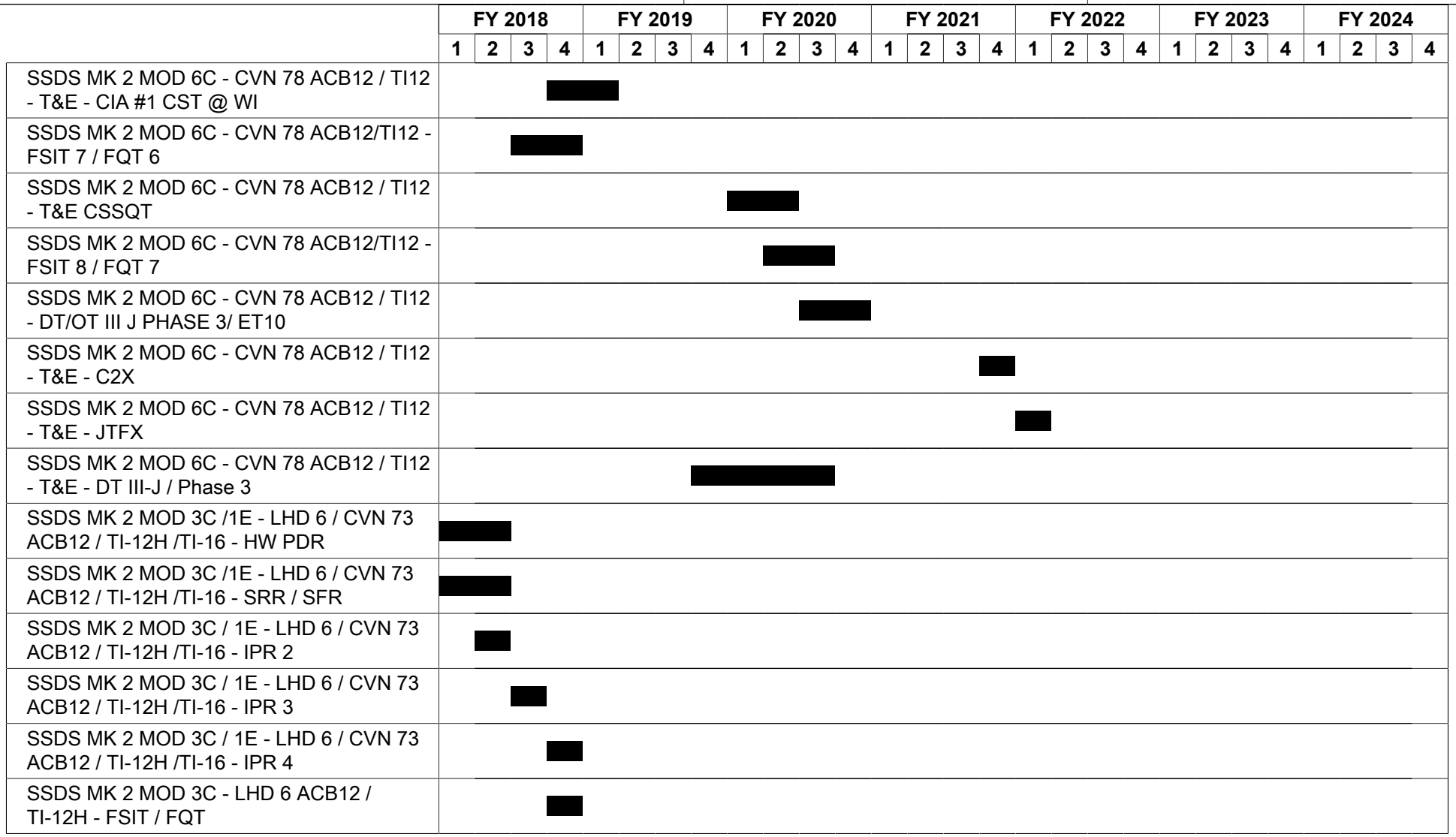
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |



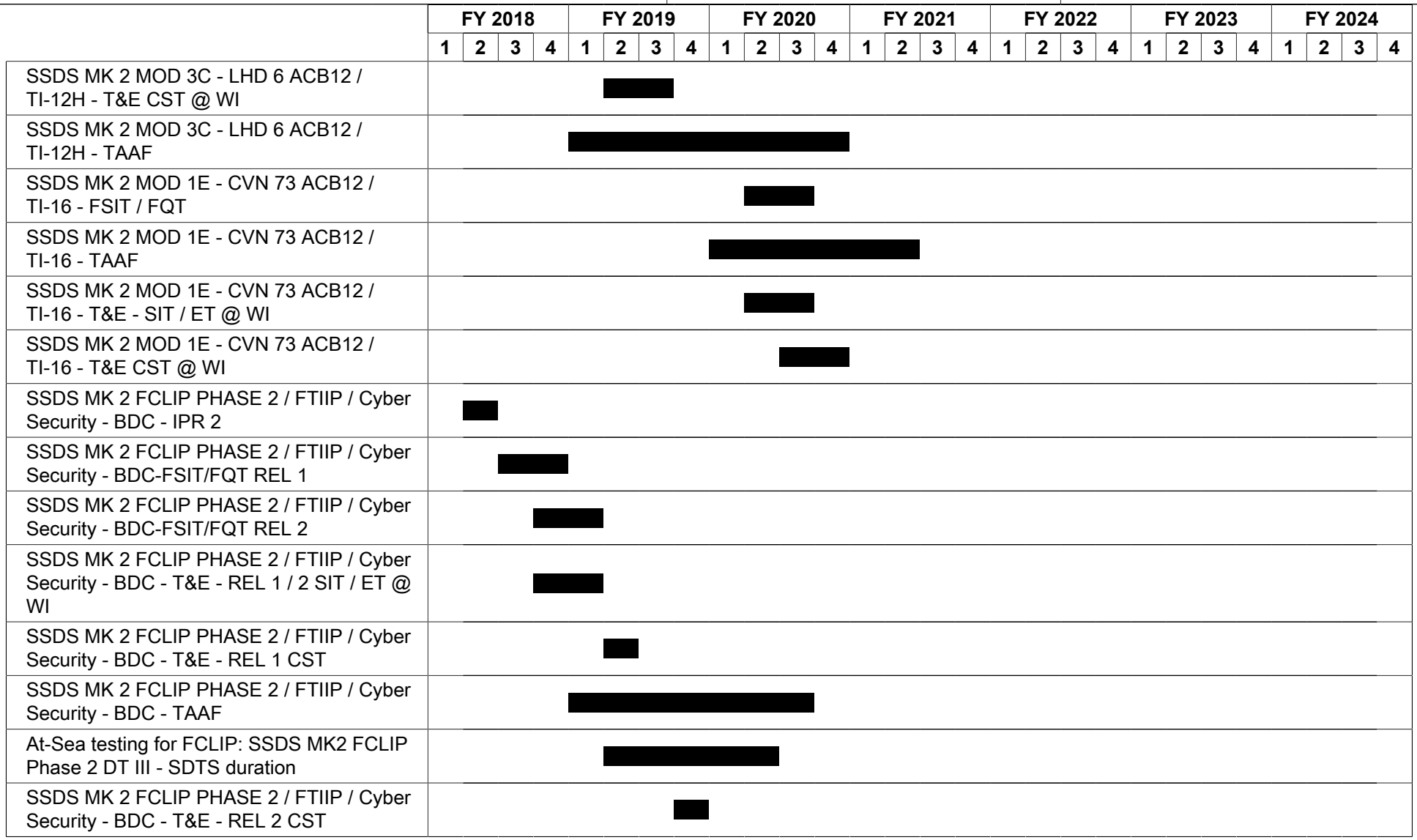
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |



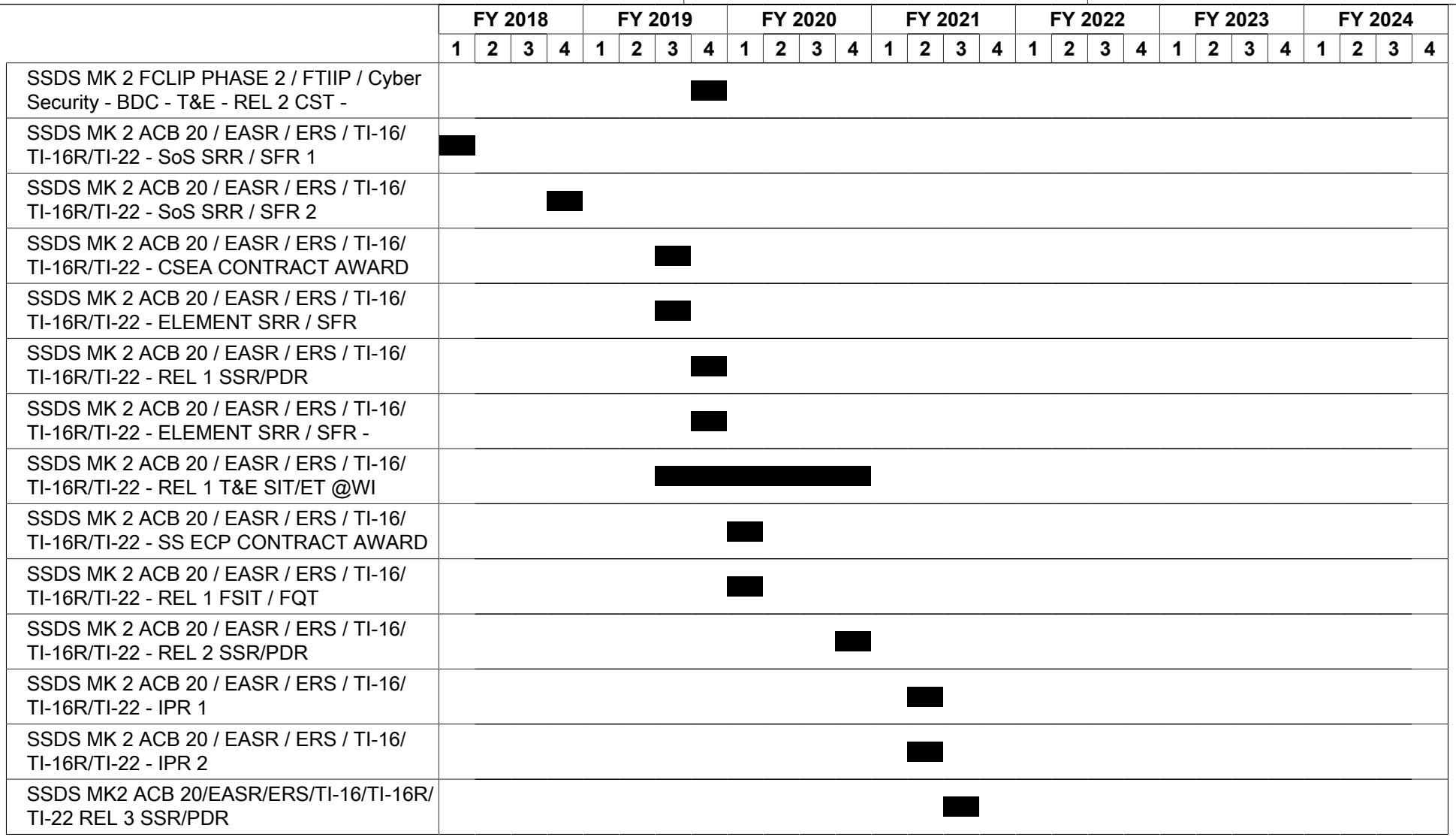
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |



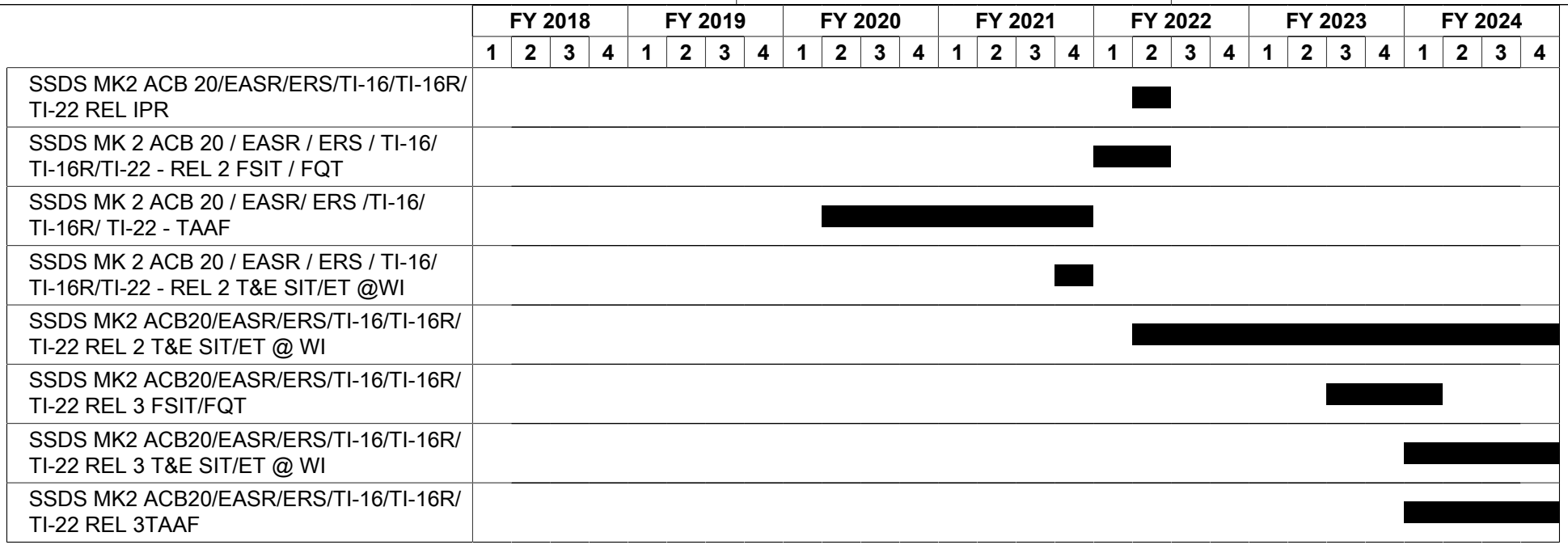
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2178*** | | | | |
| SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 9) TAAF | 1 | 2018 | 3 | 2020 |
| SSDS MK2 Mod 5C (DT-III-I Phase 1) CVI | 2 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 5C (LSD) - TI-12 / TI-12H (BUILD 10) S/W DCT1 | 1 | 2018 | 3 | 2020 |
| SSDS MK2 Mod 5C (DT-III-I Phase 1) AD | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 5C (LSD) - FCLIP FSIT / FQT | 4 | 2018 | 4 | 2018 |
| SSDS MK2 Mod 5C (OT-III-I Phase 3) CVPA | 1 | 2019 | 1 | 2019 |
| SSDS MK 2 MOD 5C (LSD) - TAAF | 2 | 2018 | 4 | 2018 |
| SSDS MK2 Mod 5C (DT-III-I Phase 1) AA | 3 | 2019 | 3 | 2019 |
| SSDS MK2 Mod 5C (LSD)-T&E-DT Phase 1 @ ICSTF | 1 | 2018 | 2 | 2018 |
| SSDS MK2 Mod 5C LSD-T&E CST Build 9 CST | 2 | 2019 | 3 | 2019 |
| SSDS MK 2 MOD 5C (LSD) - T&E - LSD 51 CSSQT | 3 | 2018 | 3 | 2018 |
| SSDS MK2 Mod 5C LSD-T&E CST Build 10 CST | 1 | 2019 | 2 | 2019 |
| SSDS MK 2 MOD 5C (LSD) - T&E - LSD 49 CSSQT - OT III / Phase 2 / ET14 | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 5C (LSD) - T&E - (SDTS) - DT/OT III I/PHASE 2/ET12 /TRKEX | 3 | 2018 | 4 | 2018 |
| SSDS MK2 Mod 5C (LSD)- T&E - DT Phase 3 / LSD 49 | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - LHD 2 CSSQT | 1 | 2018 | 1 | 2018 |
| SSDS MK 2 MOD 3C / 1C - LHD 2 / CVN 72 ACB12 / TI12 - T&E - CVN 72 CSSQT | 1 | 2018 | 2 | 2018 |
| SSDS MK2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - SIT/ET @ WI | 1 | 2018 | 3 | 2020 |
| SSDS NMK2 Mod 6C (DT-III-J Phase 1) CVI | 3 | 2019 | 3 | 2019 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - / SW DCTI 4 | 1 | 2018 | 2 | 2018 |
| SSDS NMK2 Mod 6C (DT-III-J Phase 1) AD | 1 | 2020 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 4 / FQT 3 | 1 | 2018 | 4 | 2019 |
| SSDS NMK2 Mod 6C (OT-III-J Phase 3) CVPA | 3 | 2020 | 3 | 2020 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 -T&E - DT III J PHASE 3 / ET10 @ CVN 78 | 1 | 2018 | 4 | 2020 |
| SSDS NMK2 Mod 6C (OT-III-J Phase 3) AA | 4 | 2020 | 4 | 2020 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 -T&E CST EVENT(S ) @ WI | 2 | 2018 | 3 | 2020 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - TEST ANALYZE & FIX (TAAF) | 1 | 2018 | 2 | 2021 |
| SDTS - SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FCL RISK REDUCTION TRKEX / MSLEX | 2 | 2018 | 3 | 2018 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 6 / FQT 5 | 2 | 2018 | 3 | 2018 |
| SDTS - SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - T&E - DT/OT III J/PHASE 3/ ET09 | 3 | 2018 | 3 | 2019 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - CIA #1 CST @ WI | 4 | 2018 | 1 | 2019 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 7 / FQT 6 | 3 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E CSSQT | 1 | 2020 | 2 | 2020 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12/TI12 - FSIT 8 / FQT 7 | 2 | 2020 | 3 | 2020 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - DT/OT III J PHASE 3/ ET10 | 3 | 2020 | 4 | 2020 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - C2X | 4 | 2021 | 4 | 2021 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - JTFX | 1 | 2022 | 1 | 2022 |
| SSDS MK 2 MOD 6C - CVN 78 ACB12 / TI12 - T&E - DT III-J / Phase 3 | 4 | 2019 | 3 | 2020 |
| SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - HW PDR | 1 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 3C /1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - SRR / SFR | 1 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 2 | 2 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 3 | 3 | 2018 | 3 | 2018 |
| SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 4 | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - FSIT / FQT | 4 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E CST @ WI | 2 | 2019 | 3 | 2019 |
| SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - TAAF | 1 | 2019 | 4 | 2020 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - FSIT / FQT | 2 | 2020 | 3 | 2020 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - TAAF | 1 | 2020 | 2 | 2021 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E - SIT / ET @ WI | 2 | 2020 | 3 | 2020 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E CST @ WI | 3 | 2020 | 4 | 2020 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - IPR 2 | 2 | 2018 | 2 | 2018 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC-FSIT/FQT REL 1 | 3 | 2018 | 4 | 2018 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC-FSIT/FQT REL 2 | 4 | 2018 | 1 | 2019 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 / 2 SIT / ET @ WI | 4 | 2018 | 1 | 2019 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 CST | 2 | 2019 | 2 | 2019 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - TAAF | 1 | 2019 | 3 | 2020 |
| At-Sea testing for FCLIP: SSDS MK2 FCLIP Phase 2 DT III - SDTS duration | 2 | 2019 | 2 | 2020 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 2 CST | 4 | 2019 | 4 | 2019 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 2 CST - | 4 | 2019 | 4 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 1 | 1 | 2018 | 1 | 2018 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 2 | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - CSEA CONTRACT AWARD | 3 | 2019 | 3 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR | 3 | 2019 | 3 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 SSR/PDR | 4 | 2019 | 4 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR - | 4 | 2019 | 4 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 T&E SIT/ET @WI | 3 | 2019 | 4 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SS ECP CONTRACT AWARD | 1 | 2020 | 1 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 FSIT / FQT | 1 | 2020 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>2178 / *QRCC* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 SSR/PDR | 4 | 2020 | 4 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 1 | 2 | 2021 | 2 | 2021 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 2 | 2 | 2021 | 2 | 2021 |
| SSDS MK2 ACB 20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3 SSR/PDR | 3 | 2021 | 3 | 2021 |
| SSDS MK2 ACB 20/EASR/ERS/TI-16/TI-16R/TI-22 REL IPR | 2 | 2022 | 2 | 2022 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 FSIT / FQT | 1 | 2022 | 2 | 2022 |
| SSDS MK 2 ACB 20 / EASR/ ERS /TI-16/TI-16R/ TI-22 - TAAF | 2 | 2020 | 4 | 2021 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 T&E SIT/ET @WI | 4 | 2021 | 4 | 2021 |
| SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 2 T&E SIT/ET @ WI | 2 | 2022 | 4 | 2024 |
| SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3 FSIT/FQT | 3 | 2023 | 1 | 2024 |
| SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3 T&E SIT/ET @ WI | 1 | 2024 | 4 | 2024 |
| SSDS MK2 ACB20/EASR/ERS/TI-16/TI-16R/TI-22 REL 3TAAF | 1 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | | | | Project (Number/Name)<br>3172 / *Joint Non-Lethal Weapons* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3172: *Joint Non-Lethal Weapons* | 44.586 | 5.140 | 3.992 | 2.100 | 1.122 | 3.222 | 4.714 | 4.628 | 4.363 | 4.449 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Develop non-lethal weapon systems in support of anti-terrorism/force protection missions. Technologies include, but are not limited to: ocular interrupters, vessel propeller occlusion systems, and acoustic hailing devices. Current efforts are focused on the Long-Range Ocular Interrupter (LROI), Hailing Acoustic Laser and Light Tactical System (HALLTS), and Maritime Vessel Stopper (MVS) technologies.

The LROI is intended to provide the U.S. Navy with the capability to deliver a bright light producing a dazzling or glare effect on a closing target to warn and/or suppress potential threats through increasing levels of visual degradation. The planned LROI will generate controlled, high-intensity output, providing warning and suppression effects. The extended range capability of LROI will effectively increase tactical decision-making time in support of escalation of force (EoF) tactics, techniques and procedures (TTP) across a broad range of military operations (ROMO). Further, the LROI will enhance Joint Force operations in determining the intent of a potential threat as early as possible.

HALLTS is a single-operator, personnel-portable, hailing and warning system developed to enhance the ability of security forces to effectively execute escalation of force and intent determination procedures. HALLTS integrates three Navy non-lethal devices consisting of an ocular interrupter, an acoustic hailing device, and a high intensity white light. HALLTS utilizes a common system controller interface and common mounting options while reducing the manpower requirements for operation of multiple non-lethal devices to more efficiently implement escalation of force procedures.

MVS technologies are systems designed to temporarily disable, slow, or stop waterborne vessels of varying degrees of size and different propulsion types in order to effectively execute escalation of force and intent determination procedures. The MVS technologies will provide the US Navy with lightweight, compact, biodegradable materials, which will stop or slow marine platforms by occlusion of any type of marine propeller or propulsor.

Develop Visual Augmentation Systems (VAS) in support of expeditionary / anti-terrorism / force protection missions.
Expeditionary force must maintain situational awareness by using VAS equipment in operational conditions during low-light and no-light environments to obtain and maintain battlefield dominance during missions to Find, Fix, Track, Target, Engage and Assess (F2T2EA) enemy combatants. Technologies include, but are not limited to: image ntensification devices, thermal imaging systems, and laser systems. Current efforts are focused on the development of a Wide Field Of View (WFOV) Goggle (>40 degrees), M2HB/M2A1 Weapon Sight (M2WS) and Visual Augmentation Module for Portable Imaging and Recording - Expeditionary (VAMPIRE). The WFOV goggle will provide enhanced situational awareness for target
detection and dismounted/mounted operations, while maintaining existing visual accuity performance levels. The purpose of the M2WS program is to provide an advanced day/night crew-served weapon sight capability to surface and expeditionary Navy personnel. The M2WS will provide for increased target detection ranges as well as provide for improved firing accuracy to minimize the number of rounds required to successfully hit the target. The VAMPIRE is a hand-held multi-spectral imaging system that provides situational awareness, allowing the user to detect and recognize potential threat craft at the maximum possible range so that Navy forces

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |

can assess nearby craft and engage appropriately. The VAMPIR contains an integrated recording (video/audio) capability which is used to document the incident. Visual Augmentation Systems are necessary to avoid accidental engagement of noncombatants while maintaining the greatest possible distance from threats. (References: COMNECC ltr Ser N43/695 dated 2 Oct 2014 (Visual Augmentation System Capability Requirements and Associated Capability Gaps); endorsed by USFFC ltr Ser N8/ N9/014 dated 17 Dec 2014; approved by OPNAV N957 ltr Ser 17U140063 dated 23 May 2017.)

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint Non-Lethal Weapons Development | 5.140 | 3.992 | 2.100 | 1.122 | 3.222 |
| ***Articles:*** | - | - | - | - | - |

***FY 2019 Plans:***
Continue development, including testing, of next generation LROI prototypes to fulfill NECC's Letter of Requirement and implement any additional engineering updates as needed. Conduct accelerated Engineering & Manufacturing Development (EMD) phase for Long Range Ocular Interrupter (LROI) as part of the recently established Navy Non-Lethal Effects (NNLE) Family of Systems (FoS) ACAT IVM program. Conduct market research of COTS acoustic hailing system to assess their performance on land and over water. Continue development, including testing, of MVS occlusion technologies to fulfill the MVS Capability Development Document, using various biodegradable materials such as polymers and synthetic proteins. Will conduct necessary research and prototype development, to include the WFOV goggle and Visual Augmentation Module Portable Imager Recorder-Expeditionary (VAMPIRE), to determine a material solution to satisfy current Visual Augmentation Systems (VAS) capability gaps encountered during missions in combat zones while in theater. The warfighter lacks the ability to detect and recognize potential threat craft at the maximum possible range and at the earliest time in all weather environments during day and night. In addition, the warfighter needs the ability to record both audio/video encounters and incidents for after action reporting.

***FY 2020 Base Plans:***
Finish EMD phase for LROI and prepare for Production & Deployment phase. Continue development of MVS occlusion technologies, including deployment methods, and enter Technology Development Phase as part of the NNLE FoS ACAT IVM program. Update HALLTS design to incorporate LROI, new COTS acoustic hailing device, and high intensity white light.

***FY 2020 OCO Plans:***
Finish test and evaluation of VAMPIRE and prepare for Milestone C. Continue development and testing of the WFOV
image tube and prepare for Milestone B for WFOV goggle.

***FY 2019 to FY 2020 Increase/Decrease Statement:***

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The FY 2020 funding request was reduced to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 5.140 | 3.992 | 2.100 | 1.122 | 3.222 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/8128: *NCW Forces Active* | 6.198 | 6.512 | 7.235 | - | 7.235 | 7.219 | 6.736 | 6.907 | 7.045 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The Navy Non-Lethal Effects (NNLE) Family of Systems (FoS) ACAT IVM Program of Record is being established as a single program with two areas of emphasis: Counter-Personnel (CP) and Counter-Materiel (CM). The initial Long Range Ocular Interrupter (LROI), which is a CP system, was designed and developed as a Rapid Acquisition. Following a FY 2016 Military Utility Assessment (MUA), the LROI was recommended to be a Program of Record (PoR), with engineering changes being made in the next generation to meet issues identified in the MUA. To that end, LROI will enter EMD phase within the NNLE FoS during FY 2019. A final developmental Technical Data Package (TDP) will be developed with user input incorporated. The developmental TDP will be included in the Request for Proposal (RFP) to industry to be further refined for a production-level TDP to be used for production decision during FY 2020. The RFP will be provided to industry to solicit offers for LRIP production after refining the TDP; subsequently, it will be provided to industry for full rate production.

The initial Hailing Acoustic Laser and Light Tactical System (HALLTS) system, another CP capability, was designed and developed using Physical Security Enterprise & Analysis Group (PSEAG) RDT&E funding. HALLTS units were included in the MUA in order to receive Fleet feedback and identify any needed engineering changes, including the development of a dual-mount to support HALLTS use by Navy Expeditionary Combat Command (NECC). Once subsystems (LROI, new acoustic hailing device, and high intensity white light) are identified, the HALLTS design will be updated along with a production-level TDP, and an RFP will be released to industry to build production units.

Maritime Vessel Stopping Occlusion Technologies (MVSOT), a CM effort, is currently in the Material Solution Analysis phase. Both Navy and Joint funding are being used for continuing research through test and evaluation of various material solutions with biodegradable polymers and synthetic proteins. Technology development phase entry is planned for FY 2020, as part of the NNLE FoS.

M2WS will deliver through two separately funded phases. Phase I was funded in FY 2016/2017 and consists of developing Product Demonstration Models (PDM) that are in accordance with all Performance Specification (PSPEC) requirements. Phase II will provide low rate initial production representative units which comply with all system requirements and subsequently for full rate production for a total of 825 systems to be fielded to NECC.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |

Initial VAMPIRE systems will be developed and tested based on KPPs identified. These units will go through user assessment for their feedback. ECP will be performed to incorporate user inputs. The RFP, including the developmental TDP, will be provided to the industry to solicit offers for the LRIP production after refining the TDP and subsequently for full rate production for a total of 200 VAMPIRE systems to be fielded to NECC.

The WFOV Goggle will first focus on the development of an enhanced resolution image intensifier tube with an active input area of approximately 20mm in diameter. Upon successful development of the new image tube, the second phase will be to develop a new binocular and/or monocular goggle including associated WFOV optics that will be optimized for use
with the 20mm image tubes producing a WFOV goggle system with no loss of visual acuity from existing systems.

**E. Performance Metrics**

Achieve entry into engineering and manufacturing development phase for LROI in Q1FY19 and receive production decision in Q2FY20. Enter technology development phase for MVSOT in Q2FY20.

Successfully achieve Milestone C for M2WS and VAMPIRE and transition to FRP. Achieve Milestone B for WFOV Goggle in Q4FY20. Successfully conduct testing and fielding to Navy users.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering | WR | NSWC Panama City : Panama City, FL | 0.000 | 3.765 | Jun 2018 | 1.661 | Jan 2019 | 0.500 | Jan 2020 | - | | 0.500 | Continuing | Continuing | Continuing |
| System Engineering | MIPR | Army SOC : TBD | 0.000 | 0.000 | | 0.400 | Feb 2019 | 0.000 | | 0.408 | Feb 2020 | 0.408 | 0.000 | 0.808 | - |
| System Engineering | WR | NSWC Dahlgren : Dahlgren, VA | 17.057 | 0.600 | Jan 2018 | 0.238 | Jan 2019 | 0.272 | Jan 2020 | - | | 0.272 | Continuing | Continuing | Continuing |
| System Engineering | WR | NSWC Port Hueneme : Port Hueneme, CA | 0.628 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| System Engineering | WR | NSWC Crane : Crane, IN | 0.580 | 0.175 | Jan 2018 | 0.700 | Feb 2019 | 0.000 | | 0.714 | Jan 2020 | 0.714 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 18.265 | 4.540 | | 2.999 | | 0.772 | | 1.122 | | 1.894 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Services (NSWC) | WR | NSWC Dahlgren : Dahlgren, VA | 4.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Engineering Services | MIPR | Army NVESD : Ft. Belvoir, VA | 0.000 | 0.000 | | 0.750 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |
| Program Management | WR | NUWC Newport : Newport, RI | 2.857 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Engineering Services (NSWC) | WR | NSWC Panama City : Panama City, FL | 2.075 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.932 | 0.000 | | 0.750 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>3172 / *Joint Non-Lethal Weapons* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NSWC Dahlgren : Dahlgren, VA | 3.300 | 0.309 | Jan 2018 | 0.000 | | 0.200 | Mar 2020 | - | | 0.200 | Continuing | Continuing | Continuing |
| Test and Evaluation | MIPR | Military Sealift Command : Washington, DC | 2.200 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NSWC Carderock : Carderock, MD | 0.000 | 0.193 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test and Evaluation | WR | NSWC Panama City : Panama City, FL | 0.000 | 0.000 | | 0.000 | | 0.628 | Dec 2019 | - | | 0.628 | 0.000 | 0.628 | - |
| Test and Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 4.925 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 10.425 | 0.502 | | 0.000 | | 0.828 | | - | | 0.828 | Continuing | Continuing | N/A |

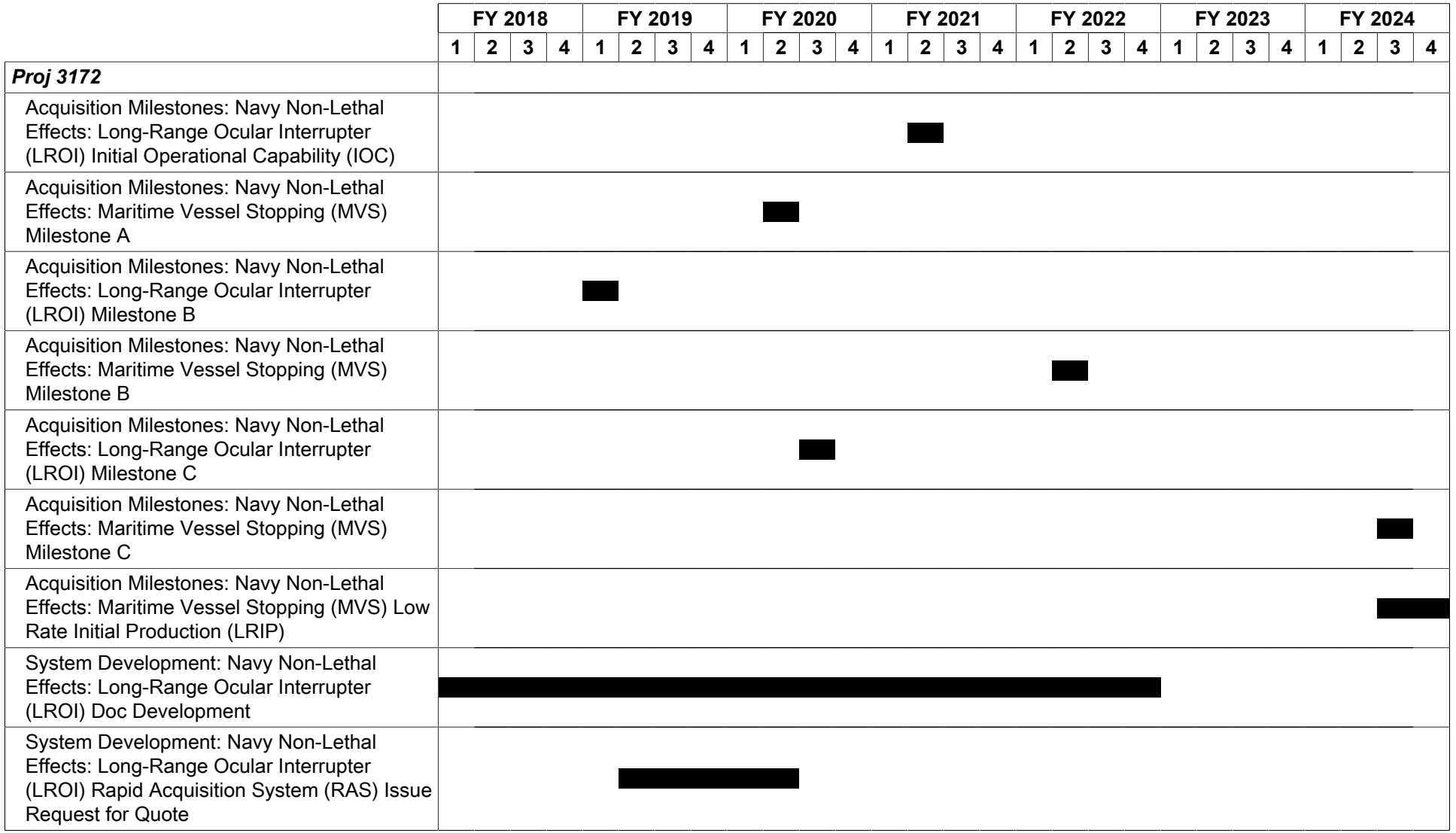
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management | WR | NSWC Panama City : Panama City, FL | 0.000 | 0.000 | | 0.125 | Jan 2019 | 0.250 | Jan 2020 | - | | 0.250 | 0.000 | 0.375 | - |
| Program Management | WR | NSWC Dahlgren : Dahlgren, VA | 6.964 | 0.098 | Jan 2018 | 0.118 | Jan 2019 | 0.250 | Jan 2020 | - | | 0.250 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.964 | 0.098 | | 0.243 | | 0.500 | | - | | 0.500 | Continuing | Continuing | N/A |

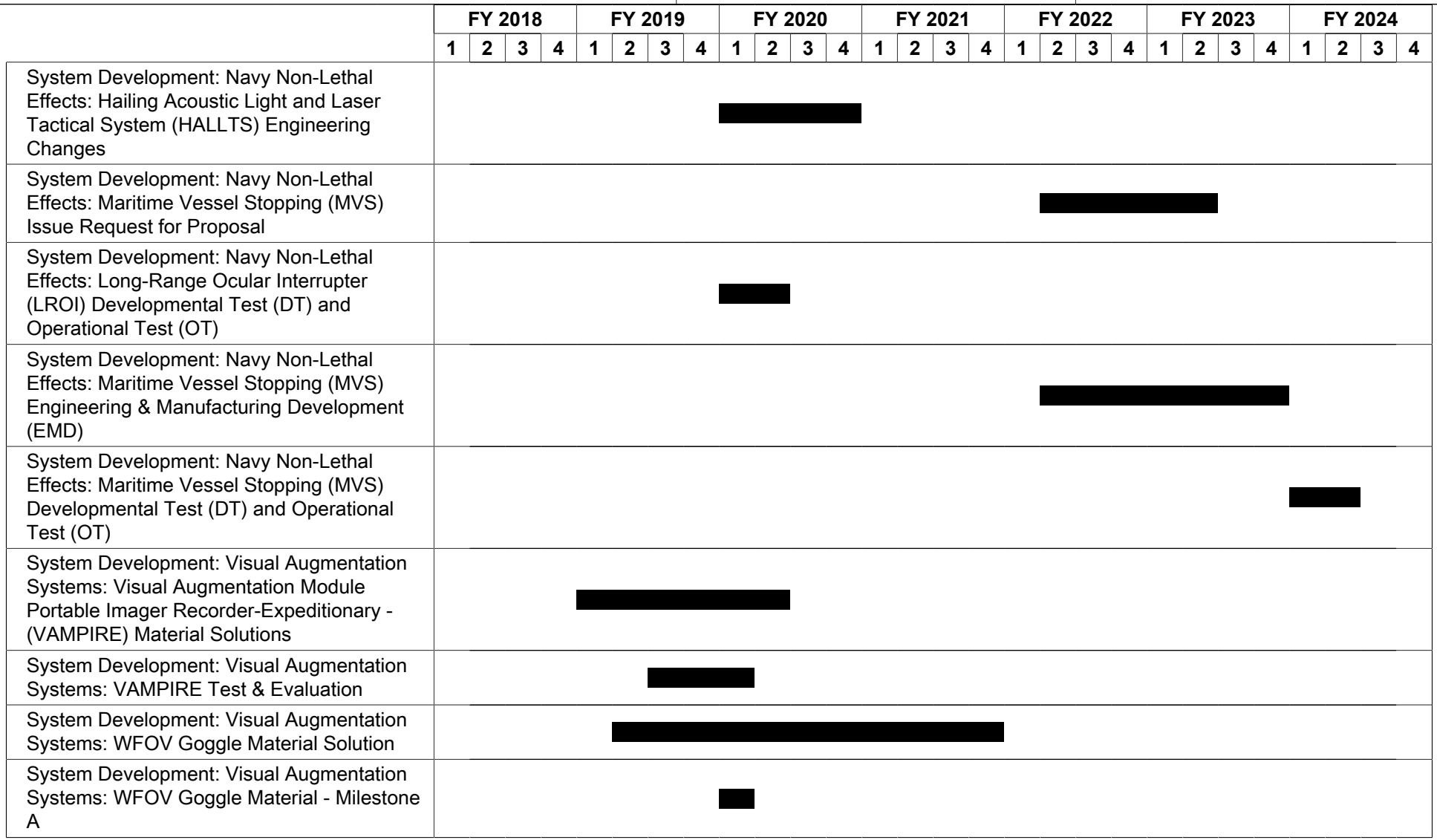
| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 44.586 | 5.140 | | 3.992 | | 2.100 | | 1.122 | | 3.222 | Continuing | Continuing | N/A |

**Remarks**

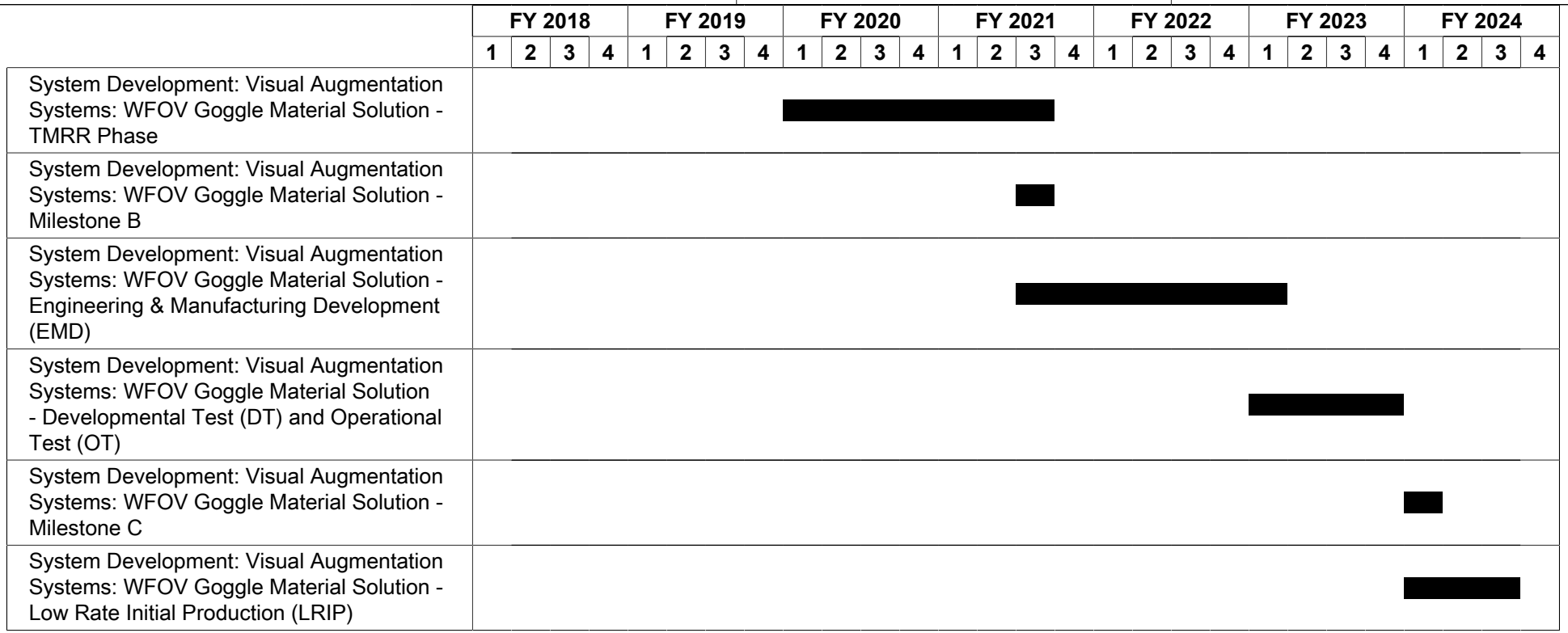
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3172*** | | | | |
| Acquisition Milestones: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Initial Operational Capability (IOC) | 2 | 2021 | 2 | 2021 |
| Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Milestone A | 2 | 2020 | 2 | 2020 |
| Acquisition Milestones: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Milestone B | 1 | 2019 | 1 | 2019 |
| Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Milestone B | 2 | 2022 | 2 | 2022 |
| Acquisition Milestones: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Milestone C | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Milestone C | 3 | 2024 | 3 | 2024 |
| Acquisition Milestones: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Low Rate Initial Production (LRIP) | 3 | 2024 | 4 | 2024 |
| System Development: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Doc Development | 1 | 2018 | 4 | 2022 |
| System Development: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Rapid Acquisition System (RAS) Issue Request for Quote | 2 | 2019 | 2 | 2020 |
| System Development: Navy Non-Lethal Effects: Hailing Acoustic Light and Laser Tactical System (HALLTS) Engineering Changes | 1 | 2020 | 4 | 2020 |
| System Development: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Issue Request for Proposal | 2 | 2022 | 2 | 2023 |
| System Development: Navy Non-Lethal Effects: Long-Range Ocular Interrupter (LROI) Developmental Test (DT) and Operational Test (OT) | 1 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3172 / *Joint Non-Lethal Weapons* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| System Development: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Engineering & Manufacturing Development (EMD) | 2 | 2022 | 4 | 2023 |
| System Development: Navy Non-Lethal Effects: Maritime Vessel Stopping (MVS) Developmental Test (DT) and Operational Test (OT) | 1 | 2024 | 2 | 2024 |
| System Development: Visual Augmentation Systems: Visual Augmentation Module Portable Imager Recorder-Expeditionary - (VAMPIRE) Material Solutions | 1 | 2019 | 2 | 2020 |
| System Development: Visual Augmentation Systems: VAMPIRE Test & Evaluation | 3 | 2019 | 1 | 2020 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution | 2 | 2019 | 4 | 2021 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material - Milestone A | 1 | 2020 | 1 | 2020 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - TMRR Phase | 1 | 2020 | 3 | 2021 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Milestone B | 3 | 2021 | 3 | 2021 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Engineering & Manufacturing Development (EMD) | 3 | 2021 | 1 | 2023 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Developmental Test (DT) and Operational Test (OT) | 1 | 2023 | 4 | 2023 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Milestone C | 1 | 2024 | 1 | 2024 |
| System Development: Visual Augmentation Systems: WFOV Goggle Material Solution - Low Rate Initial Production (LRIP) | 1 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | | | | Project (Number/Name)<br>3358 / *SSDS Training Improvement Program* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3358: *SSDS Training Improvement Program* | 11.785 | 7.347 | 7.831 | 8.532 | - | 8.532 | 12.575 | 11.729 | 10.299 | 9.280 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

SSDS Training Improvement Program provides enhancements and upgrades to the SSDS Total Ship Training Capability (TSTC) components within the combat system, combat system elements, Battle-Force Tactical Training (BFTT), and Advanced Training Domain (ATD) to address needs for increased training capability and functionality in conjunction with SSDS MK2 Advanced Capability Builds (ACB)/Fire Control Loop Improvement Project (FCLIP), Far-Term Interoperability Improvement Project (FTIIP), Task Force Cyber Awakening (TFCA) Boundary Defense Capability (BDC), and Technical Insertion efforts under PU 2178 (QRCC). These enhancements will address current and future training requirements by implementing new functionality to enable the individual warfighter through distributed battle group events to engage in more complex training requirements to support fleet required training certification events. Capability Development and integration are related to Self Defense, Underwater, Surface, and other warfare areas. Capability enhancements and upgrades include development of re-useable common components that can be leveraged by SSDS MK2 combat systems, and/or integration of re-usable common components developed by the TSTC/BFTT Program and AEGIS Advanced Training Domain (ATD)/TSTC Total Ship Training Capability (TSTC) projects to meet AEGIS combat system training requirements. TSTC continues to integrate and update, as new tactical capabilities are being introduced, to enable crew operator proficiency training for basic and sustainment level training events, through distributed strike group certification fleet synthetic training (FST) events and including COMPTUEX FST at Sea integration into Live, Virtual and Constructive (LVC) environment. Continued Development is required to integrate new capabilities and interfaces to provide training for AEGIS and SSDS combat system capability upgrades, and to address the Fleet's Live, Virtual and Constructive (LVC) Fleet Training Wholeness initiative. Additionally, modernization is needed to support the DoD Training Transformation Plan, the Chief of Naval Operations Fleet Response Plan and Commander United States Fleet Forces Command Fleet Readiness Training Plan.

The Advanced Training Domain (ATD) is being developed to combine BFTT and the AEGIS Combat Training System (ACTS) into a common system that integrates with AEGIS BL 9.2.2AF, and SSDS BL 11.xAF. ATD is being hosted along with the AEGIS and SSDS combat system on TI-16 common processing and display hardware. ATD is being designed to be the core of the Total Ship Training Capability, and is projected to be more reliable, simpler to use, and architected to be extensible to meet interoperability and capability enhancement challenges in the future.

BFTT is being updated to maintain integration and capability enhancements developed for the Cooperative Engagement Capability (CEC), Surface Electronic Warfare Improvement Program (SEWIP), and the Carrier Tactical Support Center (CV-TSC), and SSDS Fire Control Loop Improvement Program.

TSTC provides realistic joint warfare training across the spectrum of armed conflict, realistic unit level team training in all warfare areas (e.g. NIFC-CA and BMD missions to support IAMD). TSTC provides ships' Commanding Officers and Battle Group/Battle Force Commanders with the ability to conduct coordinated realistic, high stress, combat system level team training as an integral part of the Afloat Training Organization, the Tactical Training Groups and C2F/C3F FST/LVC events.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

Develop and integrate MH-60R simulator to enable embedded shipboard training in support of basic and sustainment training, as well as establishes the pathway to support pier-side Fleet Synthetic Training (FST) events.

Develop and Integrate Cooperative Engagement Capability (CEC) Enhanced Training (CET) to support basic and sustainment level training, as well as provide ability to distribute and establish CEC data link during pier-side fleet synthetic training exercises. CET will also provide enable proficiency training of NIFC-CA capability.

Develop and integrate CEC Interim Training (CIT) capability to support pier-side fleet synthetic training events. This is an interim capability support the distributed portion of the CET capability, until CET is fully deployed. This supports training of strike groups of new tactical capabilities that were integrated into the AEGIS BL9 ships, and provides the necessary functionality to allow ships to train as a strike group.

Develop and integrate upgrades to Battle-Force Electronic Warfare Trainer (BEWT) to support soft kill training with NULKA.

Develop Identification Friend or Foe (IFF) simulator to enable training of Modes 1, 2, 3A, 4, C, 5 and S on both AEGIS and SSDS ships. Capability will support AEGIS and SSDS IFF MODE 4/5 Integration program will address training Mode 4 Inoculation, and allow training of Modes 5 and S IFF.

Develop and integrate commensurate training improvements to SSDS ACB 20 for Enhanced Sea Sparrow Missile (ESSM) and Electronic Warfare (EW) tactical improvements.

Integrate Navy Continuous Training Environment (NCTE) networking and cyber security upgrades to maintain authorization to participate in distributed shipboard training events.

TSTC integrated on SSDS provides the capability to complete system and operational level testing of the combat system.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SSDS Total Ship Training Capability | 7.347 | 7.831 | 8.532 | 0.000 | 8.532 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Initiate requirements for the SSDS Integrated Combat System (ICS) that will provide SSDS ships the ability to train using Live-Virtual-Constructive (LVC). LVC will improve the Navy's competitive advantage via high end training and enable contested environment strike group training in accordance with strategic documents.<br><br>- For the SSDS MK2 ACB-20 Baseline, continue the development of the requirements to support ESSM Block 2 simulation increased capability against closely spaced objects, and stream raids. Provide 2T uplink simulation that provided continuous targeting data to synthetic ESSM missile through intercept. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - For the SSDS MK2 ACB-20 Baseline, continue the design and development for integrated and optimized employment of decoys, Electronic Attack (EA), and hard kill and soft kill weapons effects against emerging threats. Provide the capability to support training with Soft Kill Coordination, EW Battle Management, and AOEW.<br><br>- Continue development of re-hosting Battle Force Tactical Training (BFTT) / Advanced Training Domain (ATD) capability into SSDS MK2 TI-16 Hardware. Continue development and integration of this capability in support of installation on CVN-73 and future SSDS baselines.<br><br>- Continue supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training. Continue systems engineering of CEC Tactical Software Full Training Support. | | | | | |
| ***FY 2020 Base Plans:***<br>- Complete functional requirements and initiate design for the SSDS MK2 ACB-20 Combat System that will provide the ability to train using Live-Virtual-Constructive (LVC). LVC will improve the Navy's competitive advantage via high end training and enable contested environment strike group training in accordance with strategic documents.<br><br>- For the SSDS MK2 ACB-20 Baseline, continue implementation to support ESSM Block 2 simulation increased capability against closely spaced objects, and stream raids. Continue the design and development for integrated and optimized employment of decoys, Electronic Attack (EA), and hard kill and soft kill weapons effects against emerging threats. Provide the capability to support training with Soft Kill Coordination, and Advanced Off board Electronic Warfare.<br><br>- Continue development of integrating the Advanced Training Domain (ATD) capability into SSDS MK2 TI-16 Hardware. Continue development and integration of this capability in support of installation on SSDS MK2 ACB-12 Baselines. Initiate requirements and design for integrating ATD with SSDS MK2 ACB-20 baselines.<br><br>- Continue supporting the development of Cooperative Engagement Capability (CEC) integrated training in support of Fleet Synthetic Training. Continue systems engineering of CEC Tactical Software Full Training Support. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Initiate requirements for developing a PHALANX Close-In Weapon System (CIWS) simulation capability that includes CIWS operator training capability and supports Fast Attack Craft (FAC) / Fast Inshore Attack Craft (FIAC) training capability.<br><br>- Begin integration of the UPX-29 IFF simulation capability with the Cooperative Engagement Capability (CEC) as part of the Ship Self Defense System training capability.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase is for Fleet Training Wholeness Strike Group CEC Training at Sea efforts. This investment provides for the integration of the UPX-29 IFF simulation capability with the Cooperative Engagement Capability (CEC) as part of the Ship Self Defense System (SSDS) Integrated Combat System training capability. The UPX-29 IFF SIM provides Mode 5 simulation not available with the legacy Battle Force Tactical Training (BFTT) System. The FY 2020 funding request was reduced by $1.925 million to account for the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 7.347 | 7.831 | 8.532 | 0.000 | 8.532 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0204571N/1427: *Surface Tactical Team Trainer (PU 1427)* | 15.081 | 42.046 | 67.790 | - | 67.790 | 51.628 | 37.067 | 19.183 | 16.325 | Continuing | Continuing |
| • RDTEN/0604307N/3357: *AEGIS Training Improv. Prog. (PU 3357)* | 7.717 | 6.946 | 10.078 | - | 10.078 | 8.898 | 7.968 | 6.139 | 5.348 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

For the SSDS MK2 software development, including the integration of TSTC software improvements and the TI-16 Open Architecture Computing Environment, the acquisition strategy identified for SSDS MK2 for QRCC Project (PU 2178) (R-2A exhibit) applies.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

**E. Performance Metrics**

Performance metrics for SSDS MK2 for QRCC Project (PU 2178) apply (R-2A exhibit). The milestones identified in the R-4A exhibit for PU2178 apply for the CVN78 SSDS MK2 ACB-12 / TI-12 baseline development and the integration of the DBR simulation software to provide CVN78 in-port and underway fire control loop training capabilities. The milestones for implementation of TSTC improvements into future SSDS MK2 ICS baselines for the SSDS MK2 FCLIP Phase 2 / FTIIP / Cyber Security BDC, and ACB-20 / EASR / ERS baselines in QRCC Project (PU 2178) apply and are listed in the R-4A exhibits for PU 3358.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>3358 / *SSDS Training Improvement Program* | |

**Product Development ($ in Millions)**

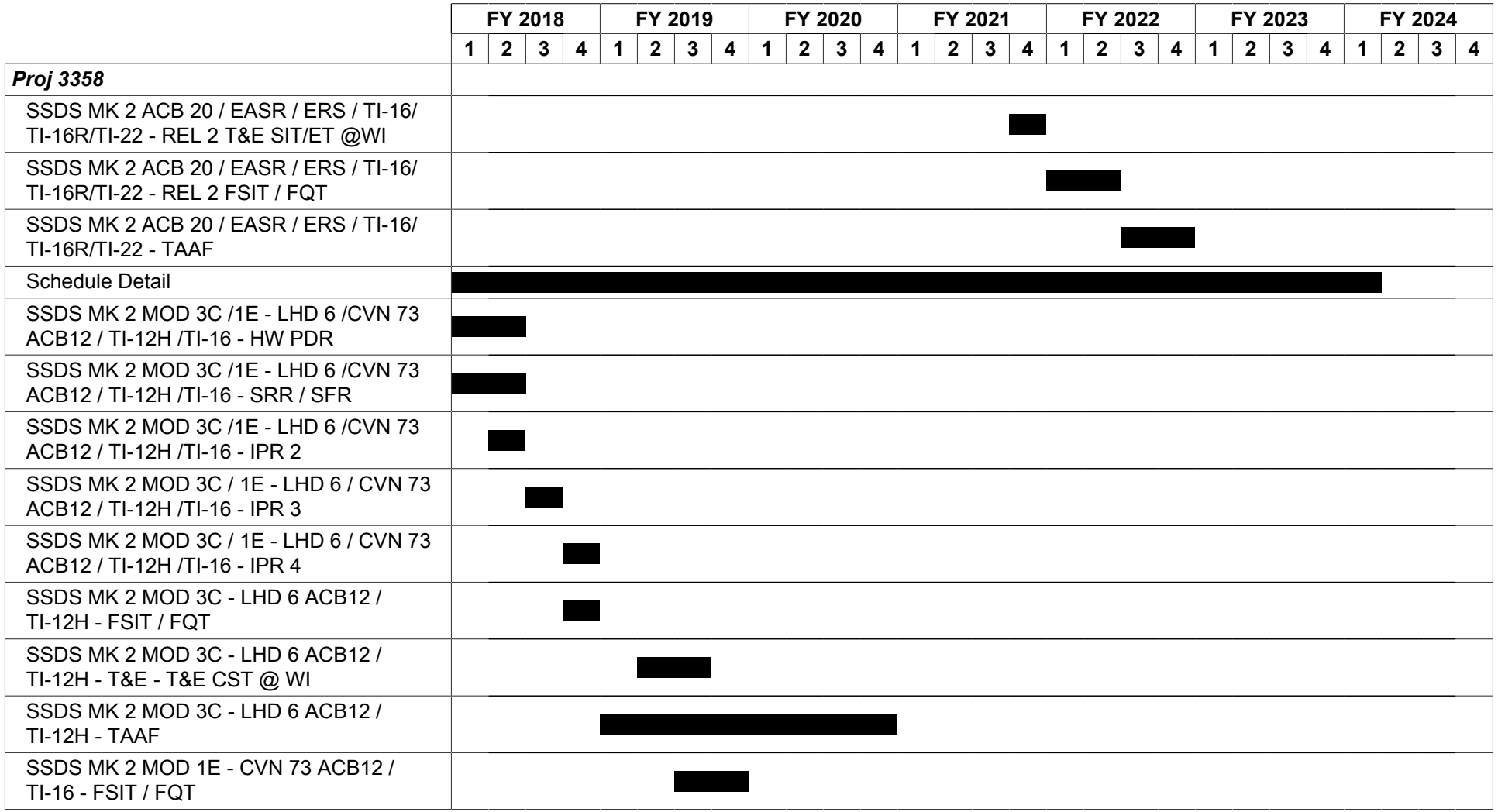
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSTC Sys Eng | WR | NSWC DD : Dahlgren, VA | 0.423 | 0.350 | Nov 2017 | 0.767 | Nov 2018 | 0.542 | Nov 2019 | - | | 0.542 | 0.000 | 2.082 | - |
| TSTC Sys Eng | WR | CDSA DN : Dam Neck, VA | 2.286 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.286 | - |
| TSTC Sys Eng / Integration | C/CPIF | Raytheon (4112) : Suffolk, VA | 1.076 | 0.079 | Dec 2017 | 0.275 | Dec 2018 | 0.185 | Dec 2019 | - | | 0.185 | 0.000 | 1.615 | - |
| TSTC TDL Gateway | WR | SPAWAR PMW 150 : San Diego, CA | 0.421 | 0.000 | | 0.000 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.421 | - |
| TSTC Sys Eng / PSEA | SS/CPIF | RSC (5128) : San Diego, CA | 3.095 | 1.665 | Nov 2017 | 0.258 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| TSTC Sys Eng / MH-60R Training Capability | WR | Keyport (NUWC) : Keyport, RI | 0.409 | 0.750 | Nov 2017 | 0.000 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| TSTC Planning Support | C/CPIF | TMB : Washington, DC | 0.025 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.025 | - |
| TSTC ATD | TBD | IWS 1.0 : Washington, DC | 0.000 | 3.038 | Dec 2017 | 3.048 | Dec 2018 | 2.947 | Dec 2019 | - | | 2.947 | 0.000 | 9.033 | - |
| TSTC ESSM BLK2/EW Upgrades | TBD | Various : Various | 4.050 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.050 | - |
| TSTC EW | TBD | IWS 2.0 : Washington, DC | 0.000 | 1.019 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.019 | - |
| TSTC NCTE | WR | Corona(NSWC) : Corona, CA | 0.000 | 0.405 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.405 | - |
| TSTC GWS | TBD | IWS 3.0 : Washington, DC | 0.000 | 0.041 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.041 | - |
| TSTC FTW SENSOR | TBD | PEO IWS 2.0 : Washington, DC | 0.000 | 0.000 | | 2.353 | Dec 2018 | 1.976 | Dec 2019 | - | | 1.976 | 0.000 | 4.329 | - |
| TSTC FTW FCLIP / CSEA | TBD | TBD : Not Specified | 0.000 | 0.000 | | 1.130 | Dec 2018 | 1.491 | Dec 2019 | - | | 1.491 | 0.000 | 2.621 | - |
| TSTC FTW / STRIKE CEC | TBD | PEO IWS 6.0 : Washington, DC | 0.000 | 0.000 | | 0.000 | | 1.391 | Dec 2019 | - | | 1.391 | 0.000 | 1.391 | - |
| | | **Subtotal** | 11.785 | 7.347 | | 7.831 | | 8.532 | | - | | 8.532 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>3358 / *SSDS Training Improvement Program* | |

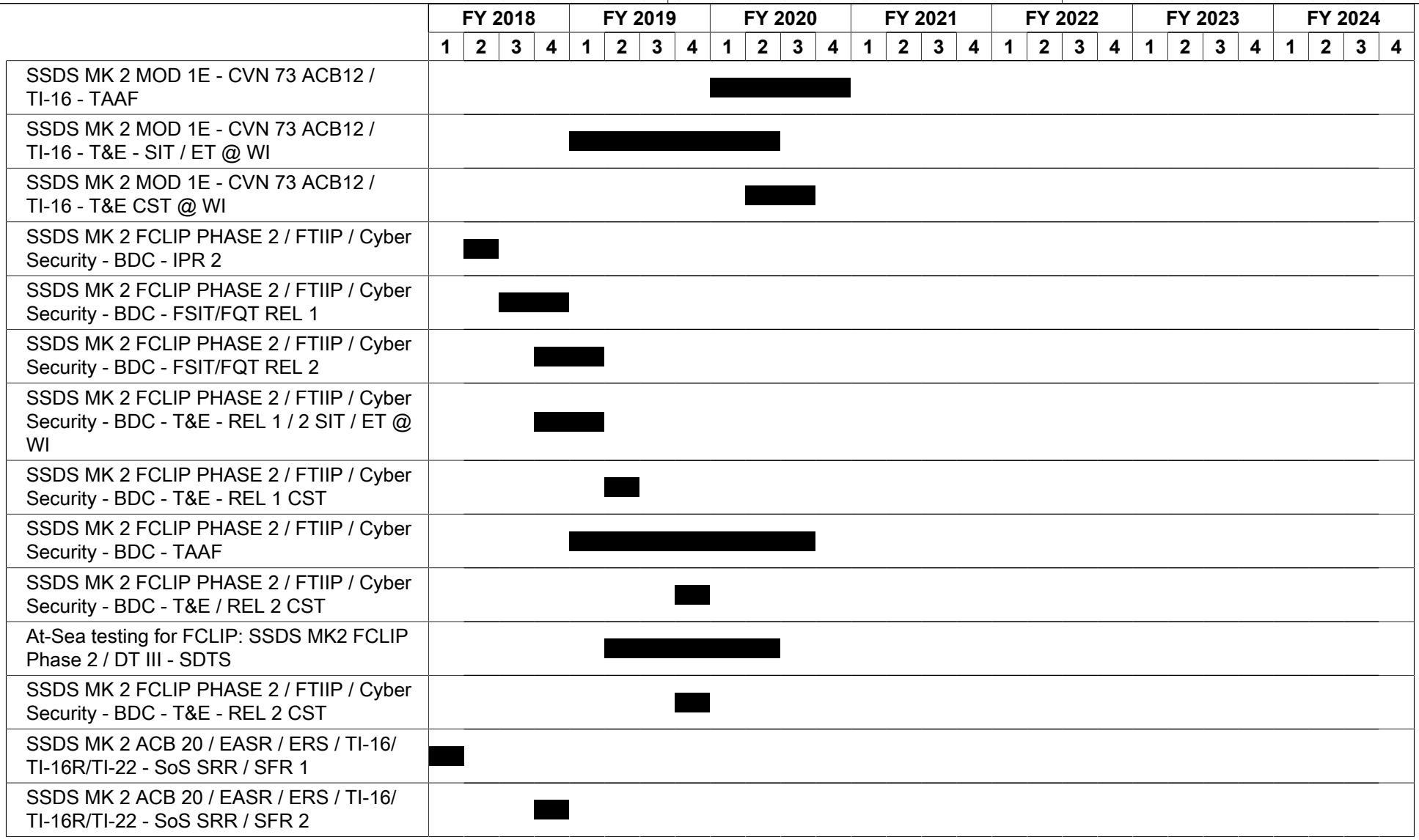
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 11.785 | 7.347 | | 7.831 | | 8.532 | | - | | 8.532 | Continuing | Continuing | N/A |

**Remarks**

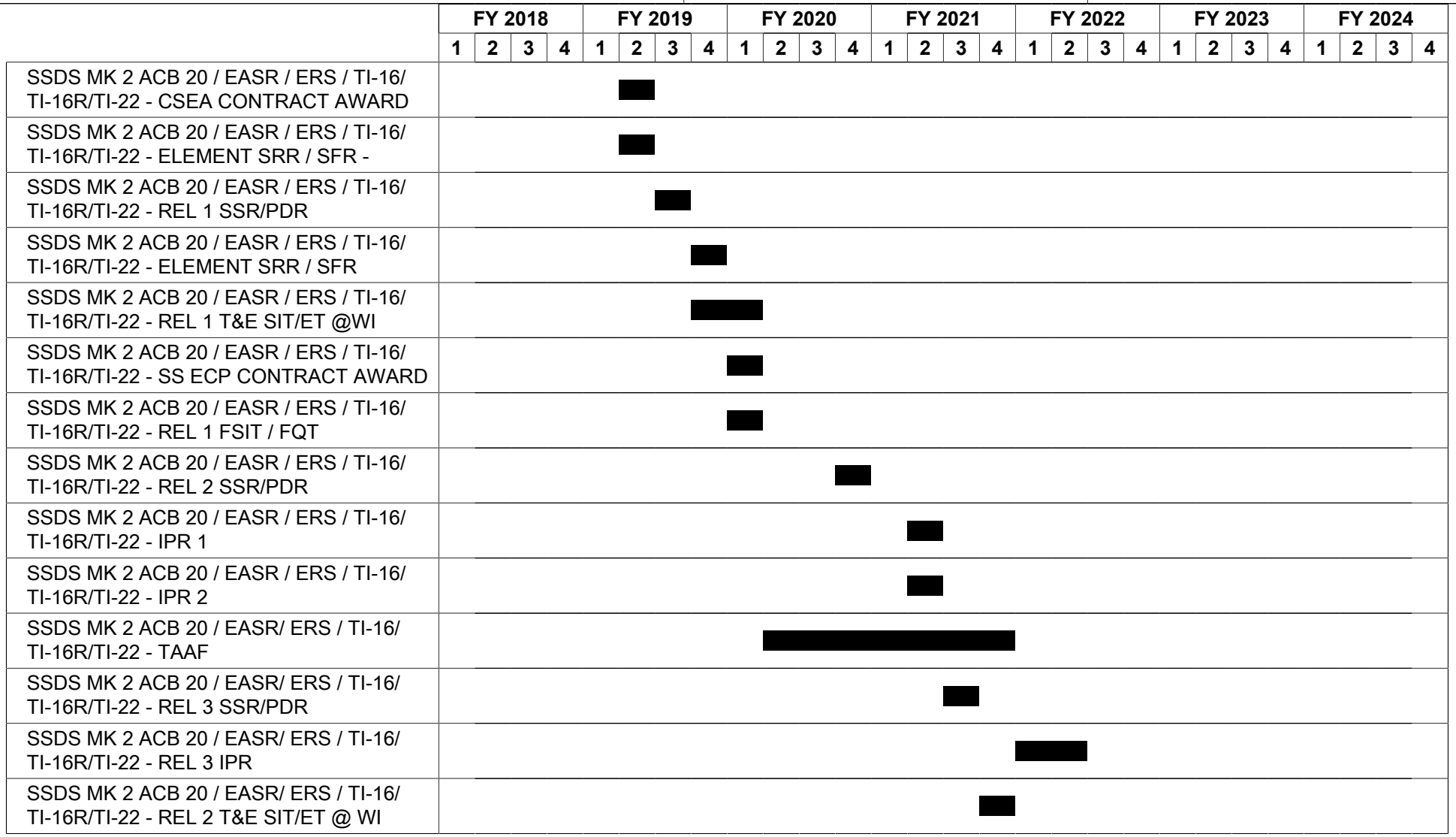
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |



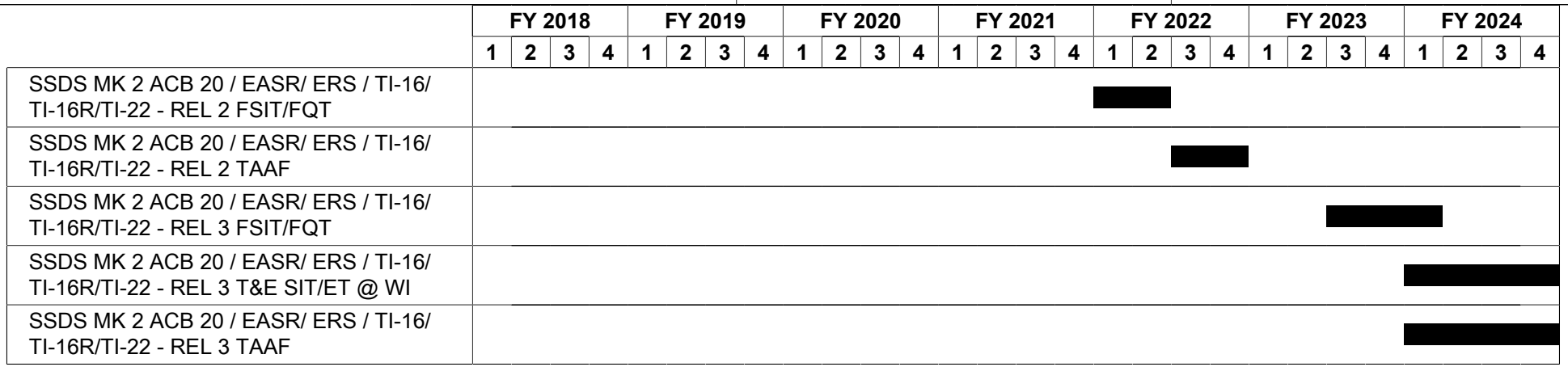
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3358*** | | | | |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 T&E SIT/ET @WI | 4 | 2021 | 4 | 2021 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 FSIT / FQT | 1 | 2022 | 2 | 2022 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - TAAF | 3 | 2022 | 4 | 2022 |
| Schedule Detail | 1 | 2018 | 1 | 2024 |
| SSDS MK 2 MOD 3C /1E - LHD 6 /CVN 73 ACB12 / TI-12H /TI-16 - HW PDR | 1 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 3C /1E - LHD 6 /CVN 73 ACB12 / TI-12H /TI-16 - SRR / SFR | 1 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 3C /1E - LHD 6 /CVN 73 ACB12 / TI-12H /TI-16 - IPR 2 | 2 | 2018 | 2 | 2018 |
| SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 3 | 3 | 2018 | 3 | 2018 |
| SSDS MK 2 MOD 3C / 1E - LHD 6 / CVN 73 ACB12 / TI-12H /TI-16 - IPR 4 | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - FSIT / FQT | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - T&E - T&E CST @ WI | 2 | 2019 | 3 | 2019 |
| SSDS MK 2 MOD 3C - LHD 6 ACB12 / TI-12H - TAAF | 1 | 2019 | 4 | 2020 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - FSIT / FQT | 3 | 2019 | 4 | 2019 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - TAAF | 1 | 2020 | 4 | 2020 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E - SIT / ET @ WI | 1 | 2019 | 2 | 2020 |
| SSDS MK 2 MOD 1E - CVN 73 ACB12 / TI-16 - T&E CST @ WI | 2 | 2020 | 3 | 2020 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - IPR 2 | 2 | 2018 | 2 | 2018 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - FSIT/FQT REL 1 | 3 | 2018 | 4 | 2018 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - FSIT/FQT REL 2 | 4 | 2018 | 1 | 2019 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 / 2 SIT / ET @ WI | 4 | 2018 | 1 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 1 CST | 2 | 2019 | 2 | 2019 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - TAAF | 1 | 2019 | 3 | 2020 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E / REL 2 CST | 4 | 2019 | 4 | 2019 |
| At-Sea testing for FCLIP: SSDS MK2 FCLIP Phase 2 / DT III - SDTS | 2 | 2019 | 2 | 2020 |
| SSDS MK 2 FCLIP PHASE 2 / FTIIP / Cyber Security - BDC - T&E - REL 2 CST | 4 | 2019 | 4 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 1 | 1 | 2018 | 1 | 2018 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SoS SRR / SFR 2 | 4 | 2018 | 4 | 2018 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - CSEA CONTRACT AWARD | 2 | 2019 | 2 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR - | 2 | 2019 | 2 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 SSR/PDR | 3 | 2019 | 3 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - ELEMENT SRR / SFR | 4 | 2019 | 4 | 2019 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 T&E SIT/ET @WI | 4 | 2019 | 1 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - SS ECP CONTRACT AWARD | 1 | 2020 | 1 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 1 FSIT / FQT | 1 | 2020 | 1 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - REL 2 SSR/PDR | 4 | 2020 | 4 | 2020 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 1 | 2 | 2021 | 2 | 2021 |
| SSDS MK 2 ACB 20 / EASR / ERS / TI-16/TI-16R/TI-22 - IPR 2 | 2 | 2021 | 2 | 2021 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - TAAF | 2 | 2020 | 4 | 2021 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 SSR/PDR | 3 | 2021 | 3 | 2021 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 IPR | 1 | 2022 | 2 | 2022 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 2 T&E SIT/ET @ WI | 4 | 2021 | 4 | 2021 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 2 FSIT/FQT | 1 | 2022 | 2 | 2022 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 2 TAAF | 3 | 2022 | 4 | 2022 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 FSIT/FQT | 3 | 2023 | 1 | 2024 |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 T&E SIT/ET @ WI | 1 | 2024 | 4 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>3358 / *SSDS Training Improvement Program* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SSDS MK 2 ACB 20 / EASR/ ERS / TI-16/TI-16R/TI-22 - REL 3 TAAF | 1 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 2.895 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.895 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The integration of the LHA/D SSDS combat system with the USMC CAC2S program of record provides Land Domain command and control for the ARG/MAGTF commanders and staffs. The improved capability provides USN/USMC users, in required C2 spaces, with command and control information from multiple sources including Link 16, VMF messages, AFATDS and Blue Force Tracker to improve USN-USMC force integration.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** C2 Systems for Amphibs - Integrating CACS2 with SSDS | 2.895 | 0.000 |
| ***FY 2018 Accomplishments:*** - Initiated Systems Engineering effort for CAC2S integration with SSDS for LHA/ LHD/LPD platforms initiated JSF Integration engineering effort for initial Digital Air Control (DAC) capability.<br><br>- Initiated establishment of system integration laboratory environment for early integration efforts. | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 2.895 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

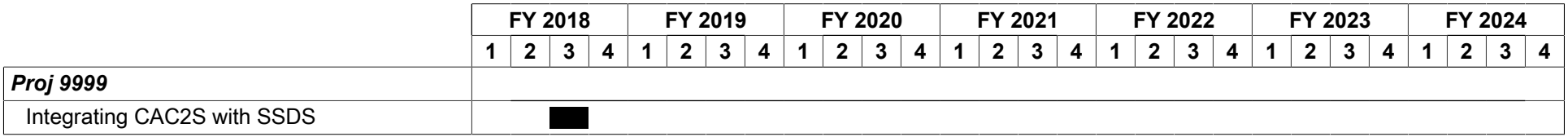
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAC2S - SE | WR | NSWC DD : Dahlgren, VA | 0.000 | 0.579 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.579 | - |
| CAC2S HW SW license | WR | NSWC CR : Crane, IN | 0.000 | 1.453 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.453 | - |
| CAC2S - ID / IQ | C/FFP | SPAWAR PAC : Not Specified | 0.000 | 0.263 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.263 | - |
| TBD - SE | WR | TBD : Not Specified | 0.000 | 0.200 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| CAC2S | C/CPIF | Raytheon : San Diego, CA | 0.000 | 0.200 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| CAC2S | C/CPIF | Raytheon - Solipsys : Not Specified | 0.000 | 0.200 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| | | **Subtotal** | 0.000 | 2.895 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.895 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 2.895 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.895 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604755N / *Ship Self Def (Detect & Cntrl)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Integrating CAC2S with SSDS | 3 | 2018 | 3 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604756N *I Ship Self Def (Engage: Hard Kill)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 944.546 | 214.132 | 193.244 | 137.268 | - | 137.268 | 121.853 | 96.302 | 60.417 | 41.233 | Continuing | Continuing |
| 0167: *5in Rolling Airframe Missile* | 259.629 | 39.620 | 26.280 | 21.956 | - | 21.956 | 6.168 | 4.085 | 4.171 | 4.256 | Continuing | Continuing |
| 0173: *NATO Sea Sparrow* | 672.179 | 129.038 | 87.400 | 78.873 | - | 78.873 | 89.293 | 81.011 | 47.958 | 36.977 | Continuing | Continuing |
| 0243: *ALaMO* | 5.594 | 35.041 | 24.714 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 65.349 |
| 2070: *OTH Missile* | 0.000 | 0.000 | 19.968 | 28.039 | - | 28.039 | 26.392 | 11.206 | 8.288 | 0.000 | 0.000 | 93.893 |
| 9081: *Phalanx CIWS SEARAM* | 7.144 | 10.433 | 9.882 | 8.400 | - | 8.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 35.859 |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 25.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.000 |

**A. Mission Description and Budget Item Justification**

This program element provides funding for the development of systems that fulfill a portion of the third phase of the Ship Self Defense: Engage Hard Kill. Development in this line will focus on hard kill capabilities in which missiles are used to intercept incoming Anti-Ship Cruise Missiles (ASCM), as well as a Surface-to Surface Strike weapon system. Missile and system improvements necessary to meet their requirements are being addressed via NATO SEASPARROW Missile System (NSSMS) (0173), Rolling Airframe Missile (RAM) (0167), Advanced Low Cost Munition Ordnance (ALaMO) (0243), Over-The-Horizon (OTH) missile (2070), and Phalanx Close-In Weapon System (CIWS) SeaRAM (9081). Missile improvements include improved kinematic performance plus advanced seeker and low elevation fusing/warhead capability improvements. CIWS System improvements include Technology Refresh for current and future fleet population. ALaMO (0243) qualifies a guided 57mm projectile with an active seeker for United States Navy (USN) use. ALaMO provides enhanced lethality against Fast In-shore Attack Craft (FIAC) when compared to existing 57mm ammunition.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 212.412 | 178.538 | 157.285 | - | 157.285 |
| Current President's Budget | 214.132 | 193.244 | 137.268 | - | 137.268 |
| Total Adjustments | 1.720 | 14.706 | -20.017 | - | -20.017 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -10.294 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 25.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -8.281 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -19.842 | - | -19.842 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | Date: March 2019 | |
|---|---|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | **R-1 Program Element (Number/Name)**<br>PE 0604756N *I Ship Self Def (Engage: Hard Kill)* | | | |
| • Rate/Misc Adjustments | 0.001 | 0.000 | -0.175 | - | -0.175 |
| • Congressional Add Adjustments | 10.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Condition Based Maintenance* | 0.000 | 8.000 |
| Congressional Add: *Next Generation Phalanx* | 0.000 | 7.000 |
| Congressional Add: *Alamo Munition Systems* | 0.000 | 10.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 25.000 |
| Congressional Add Totals for all Projects | 0.000 | 25.000 |

**Change Summary Explanation**

The FY2020 funding request was reduced by $10.0M to account for the availability of prior year execution balances. CIWS Tech Refresh efforts for ELX and LCS/ RCS were postponed reducing FY2020 by an additional $9.842M.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0167 / *5in Rolling Airframe Missile* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0167: *5in Rolling Airframe Missile* | 259.629 | 39.620 | 26.280 | 21.956 | - | 21.956 | 6.168 | 4.085 | 4.171 | 4.256 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The RAM program is an international cooperative program with the government of the Federal Republic of Germany. The purpose of this program is to develop, test, and field a surface-to-air self-defense system utilizing a dual mode, passive radio frequency/infrared RAM. The baseline system RAM Block 0/1/1A provide defense capability against active and passive anti-ship missiles, very low altitude missiles, and maneuvering missiles through the utilization of passive radio frequency and infrared seekers and a maritime optimized fuse. The RAM Block 2 upgrade programs are a cooperative requirement of the U.S. and Federal Republic of Germany, as agreed to in an international Memorandum of Understanding (MOU), and allows RAM to counter emerging, highly maneuverable ASCM threats utilizing advanced seekers while maintaining all the proven capabilities of RAM Block 0/1/1A's accurate terminal guidance, proven lethality, and no shipboard post launch dependence. Funding supports formal Developmental and Operational Testing (DT/OT) scheduled through FY 2018, data analysis, operational/test driven studies, support of combat system performance analysis and identification of operationally relevant improvements. The RAM BLK 2A Fire Control Loop Improvement Project (FCLIP) will provide software only modifications to the missile and launcher to improve raid performance. The RAM BLK 2B Raid ECP will provide an upgraded seeker and Missile-to-Missile Link (MML) capability to counter emerging complex raid threats. Development and test of RAM BLK 2B Raid ECP will occur through FY 2022.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Rolling Airframe Missile Block 2 Development and Test | 39.557 | 26.168 | 21.844 | 0.000 | 21.844 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Finalize RAM BLK 2A FCLIP design, integration and test of the FCLIP combat system changes. Funds support conducting BLK 2A FCLIP development flight test (GTV-2) and final verification and qualification testing of the AUR design. Funding for RAM BLK 2B Raid ECP to support post-PDR design efforts culminating in a Critical Design Review (CDR) and initial Controlled Test Vehicle (CTV-1) flight test. | | | | | |
| ***FY 2020 Base Plans:***<br>Integrate new seeker and MML in AUR in preparation for flight testing. Execute GTV 1A and 1C developmental flight test in Q4 in addition execute GTV 2B development flight test in Q2 FY21. Conduct post flight analysis incorporating changes into new flight software build. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0167 / *5in Rolling Airframe Missile* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease due to reduction in RAM BLK 2B Raid ECP efforts | | | | | |
| ***Title:*** Rolling Airframe Missile Block 2 Travel | 0.063 | 0.112 | 0.112 | 0.000 | 0.112 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Fund program office travel to support program/testing as required by program schedule and in accordance with travel reduction mandate. | | | | | |
| ***FY 2020 Base Plans:***<br>Fund program office travel to support program/testing as required by program schedule and in accordance with travel reduction mandate. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 39.620 | 26.280 | 21.956 | 0.000 | 21.956 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN 2242: *RAM* | 106.587 | 96.221 | 106.765 | - | 106.765 | 108.562 | 113.179 | 107.688 | 112.248 | Continuing | Continuing |
| • OPN 5231: *Ship Missile Support Equipment* | 7.656 | 16.158 | 7.464 | - | 7.464 | 10.072 | 7.195 | 6.835 | 6.973 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The RAM Program uses directed sole source contracts with Raytheon Missile Systems Company, Tucson, AZ.

**E. Performance Metrics**

Successfully complete DT/OT.
Achieved Initial Operational Capability (IOC) decision and support a FRP decision.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0167 / *5in Rolling Airframe Missile* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 2 Upgrade | C/CPAF | Various : Various | 154.650 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 154.650 | - |
| Primary Hardware Dev/Blk 1 | Various | Various : Various | 10.081 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.081 | - |
| FCLIP | WR | PHD : CA | 0.193 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.193 | - |
| FCLIP | SS/CPFF | AECOM : VA | 0.506 | 0.211 | Feb 2018 | 0.257 | Dec 2018 | 0.244 | Dec 2019 | - | | 0.244 | 0.000 | 1.218 | - |
| Raid ECP | SS/CPFF | Raytheon : Tucson/ Louisville | 15.001 | 26.296 | Oct 2017 | 18.574 | Dec 2018 | 18.162 | Dec 2019 | - | | 18.162 | 0.000 | 78.033 | - |
| FCLIP | SS/CPFF | Raytheon : Tucson/ Louisville | 32.741 | 4.084 | Jan 2018 | 5.049 | Dec 2018 | 1.169 | Dec 2019 | - | | 1.169 | 0.000 | 43.043 | - |
| Raid ECP | SS/CPFF | JHU/APL : MD | 0.450 | 0.205 | Feb 2018 | 0.050 | Dec 2018 | 0.050 | Dec 2019 | - | | 0.050 | 0.000 | 0.755 | - |
| FCLIP | WR | China Lake : CA | 1.710 | 3.337 | Jan 2018 | 0.480 | Nov 2018 | 0.458 | Nov 2019 | - | | 0.458 | 0.000 | 5.985 | - |
| Raid ECP | WR | China Lake : CA | 0.245 | 1.393 | Jan 2018 | 0.380 | Nov 2018 | 0.380 | Nov 2019 | - | | 0.380 | 0.000 | 2.398 | - |
| FCLIP | SS/CPFF | JHU/APL : MD | 0.236 | 0.181 | Feb 2018 | 0.100 | Dec 2018 | 0.100 | Dec 2019 | - | | 0.100 | 0.000 | 0.617 | - |
| Raid ECP | WR | PHD : CA | 0.050 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| Raid ECP | SS/CPFF | AECOM : VA | 0.126 | 0.587 | Feb 2018 | 0.378 | Dec 2018 | 0.378 | Dec 2019 | - | | 0.378 | 0.000 | 1.469 | - |
| FCLIP | WR | PT Mugu : CA | 0.000 | 0.025 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.025 | - |
| FCLIP | WR | NSWC DD : VA | 0.000 | 0.373 | Apr 2018 | 0.143 | May 2019 | 0.146 | May 2020 | - | | 0.146 | 0.000 | 0.662 | - |
| | | **Subtotal** | 215.989 | 36.692 | | 25.411 | | 21.087 | | - | | 21.087 | 0.000 | 299.179 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Studies and Analysis | Various | Various : Various | 1.210 | 0.200 | May 2018 | 0.200 | May 2019 | 0.200 | May 2020 | - | | 0.200 | 0.000 | 1.810 | - |
| | | **Subtotal** | 1.210 | 0.200 | | 0.200 | | 0.200 | | - | | 0.200 | 0.000 | 1.810 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0167 / *5in Rolling Airframe Missile* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Support | C/CPFF | Raytheon : Tucson | 17.338 | 0.549 | Nov 2017 | 0.300 | Nov 2018 | 0.300 | Nov 2019 | - | | 0.300 | 0.000 | 18.487 | - |
| Test Support | WR | China Lake/PHD : CA/CA | 12.400 | 0.200 | Oct 2017 | 0.157 | Oct 2018 | 0.157 | Oct 2019 | - | | 0.157 | Continuing | Continuing | Continuing |
| FOT&E | WR | China Lake : PHD, CA | 4.701 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.701 | - |
| Miscellaneous | Various | Various : Various | 5.765 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.765 | - |
| Test Support | SS/CPFF | JHU/APL : MD | 0.467 | 0.150 | Nov 2017 | 0.100 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | 0.000 | 0.817 | - |
| Integration | Various | Various : Various | 0.000 | 1.719 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.719 | - |
| | | **Subtotal** | 40.671 | 2.618 | | 0.557 | | 0.557 | | - | | 0.557 | Continuing | Continuing | N/A |

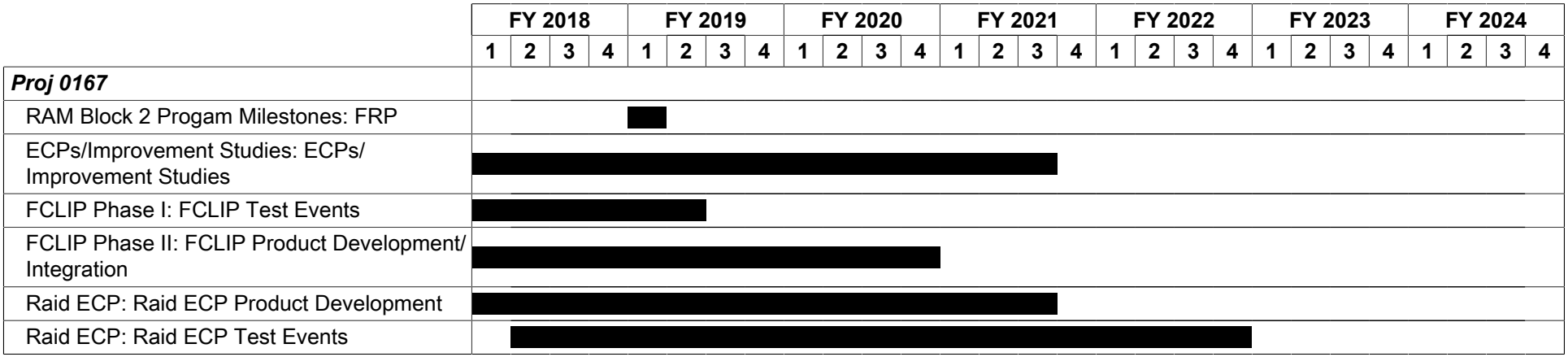
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | Program Office : VA | 1.612 | 0.110 | Oct 2017 | 0.112 | Oct 2018 | 0.112 | Oct 2019 | - | | 0.112 | Continuing | Continuing | Continuing |
| Defense Acquisition Workforce Development Fund | Various | various : various | 0.147 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.147 | - |
| | | **Subtotal** | 1.759 | 0.110 | | 0.112 | | 0.112 | | - | | 0.112 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 259.629 | 39.620 | | 26.280 | | 21.956 | | - | | 21.956 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0167 / *5in Rolling Airframe Missile* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0167 / *5in Rolling Airframe Missile* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0167*** | | | | |
| RAM Block 2 Progam Milestones: FRP | 1 | 2019 | 1 | 2019 |
| ECPs/Improvement Studies: ECPs/Improvement Studies | 1 | 2018 | 3 | 2021 |
| FCLIP Phase I: FCLIP Test Events | 1 | 2018 | 2 | 2019 |
| FCLIP Phase II: FCLIP Product Development/Integration | 1 | 2018 | 4 | 2020 |
| Raid ECP: Raid ECP Product Development | 1 | 2018 | 3 | 2021 |
| Raid ECP: Raid ECP Test Events | 2 | 2018 | 4 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0173 / *NATO Sea Sparrow* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0173: *NATO Sea Sparrow* | 672.179 | 129.038 | 87.400 | 78.873 | - | 78.873 | 89.293 | 81.011 | 47.958 | 36.977 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This project encompasses nine (9) primary efforts to enhance ship self-defense:

1. Evolved SEASPARROW Missile (ESSM) Blk 1 is a cooperative effort among 10 NATO SEASPARROW Nations and the U.S. to provide crucial defense battlespace and fire power against the fast, low altitude, highly maneuverable Anti-Ship Cruise Missile (ASCM) threat. Modifications were made to both the MK 41 Vertical Launch System (VLS) to fire from a single cell with 4 ESSM (QuadPack) and the NATO SEASPARROW Surface Missile System (NSSMS), fielding ESSM Blk 1 onboard CVN 68, LHD 1, LHA 7, CG 47, and DDG 51 class ships. ESSM Blk 1 integration efforts continue to bring the capability to CVN 78 and DDG 1000. Testing scheduled for FY20 includes ESSM Blk 1 firings from the lead ship in support of DDG 1000 and CVN 78 class activation, AEGIS B/L 9C2 live fire testing, and Combat Systems Ship Qualification Trials live fire tests aboard CVN 78 and LHA 7.

2. NATO SEASPARROW Technical Direction Agent (TDA) - TDA support for the NSSMS Mk 57 Mods 12-15 which is integrated with the Ship Self Defense System (SSDS) Mk 2 to provide ship missile defense utilizing an open architected design on all CVN, LHA, and LHD class ships. A Launcher Min-Mod effort is scheduled for Mk 57 platforms making each upgraded ship ESSM Blk 1 and ESSM Blk 2 capable.

3. ESSM Blk 2 Risk Reduction/ESSM Blk 2 Engineering and Manufacturing Development (EMD):
ESSM Blk 2 upgrade is a cooperative effort between U.S Navy and NATO SEASPARROW Consortium Nations. ESSM Blk 2 upgrade replaces the largely obsolete guidance section with a dual mode Active/Semi-Active X-Band seeker capable of defeating future threat capabilities within the existing envelope, including; smaller signatures, increased raid sizes, and adverse environments including countermeasures. Threat types include: advanced Anti-Ship Cruise Missiles (ASCMs), Anti-Ship Ballistic Missiles, surface and asymmetrical. The consortium nations provided the majority of their funding early in the program (FY15-17) with the US providing the bulk of its funding later in EMD (FY18-20). The remaining budget is required to complete ESSM Blk 2 EMD.

4. Improved Stalker (I-Stalker) provides incremental improvements to the currently fielded Stalker Long Range Electro-Optic Sensor System (SLREOSS) in response to a 2016 United States Fleet Forces Command (USFFC) Operational Needs Statement (ONS). SLREOSS was developed as a modular, portable, form/fit replacement for the NATO Sea Sparrow Missile System (NSSMS) MK 6 Low Light Level Television (LLLTV) in response to the 2010 Naval Forces Central Command (NAVCENT) Counter Swarm Urgent Operational Need (UON) to combat Fast Attack Craft/Fast Inshore Attack Craft (FAC/FIAC). It is currently being fielded in either the NSSMS MK6 MOD 3 LLLTV Director Mount configuration or NSSMS MK6 MOD 4 LLLTV Independent Mount configuration depending on platform specifications. I-Stalker will provide required upgrades to the SLREOSS Independent Mount configuration with the enhanced capabilities provided by the Navy owned Situational Awareness System (SAwS) to deliver an integrated radar and electro-optic/Infrared control and display suite. I-Stalker includes two (2) NSSMS MK6 MOD 4 LLLTV Independent Mount systems and one (1) SAwS which are nomenclatured and installed as an AN/SAY-3.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

5. Dual-Band Transceiver (DBT). The ESSM Blk 2 missile will utilize a DBT for in-flight data communications. This two-way datalink enables control and management of the missile during flight. This DBT leverages the new DDG 1000 / CVN 78 X-Band Transceiver to incorporate the functions to support S-Band Aegis data link (i.e. a Dual Band Transceiver). This resolves S-band obsolescence issues and provides a common transceiver across the ESSM inventory. DBT activities ended in FY18.

6. Transition to Production (TTP). Transition to Production execution ensures the design (Hardware, Software, Test Equipment, Production Tooling, etc.), defined during the E&MD Phase is successfully transitioned out of the engineering environment into a stable and capable production/manufacturing environment. During the early phase of Block 1 production the program experienced a series of 'process control failures' and 'production stoppages' leading to a "Blue Team" assessment and findings. One of the key underlying conditions identified as contributing to the discrepancies above was "incomplete transition to production activities and inadequate systems engineering." The Block 2 TTP phase of program execution exists to address the shortfalls identified in the "Blue Team" report and to ensure the requisite resources are in place to support the program as design activities end and Low Rate Initial Production(LRIP) begins to deliver missiles at a rate commensurate with the requirements of LRIP and Full Rate Production (FRP).

7. Blk 2 Follow-on Test & Evaluation (FOT&E). The ESSM Blk 2 Milestone Decisionm Authority mandated that ESSM Blk 2 conduct FOT&E on SSDS platform and fully support DDG flight III operational testing. Blk 2 EMD and TTP shared consortium development efforts end in FY20. This is for US Sole Combat Systems integration testing including but not limited to: Aegis Baseline 10 integration, Ship Self-Defense System (SSDS) integration, and other potential (future Frigate) platform integration testing as required. This includes support with appropriate ESSM Block 2 Missile Simulator Unit (MSU) with Raytheon Missile System operator support.

8. Blk 2 Obsolescence and Redesign. Explore missile launcher and MK 9 Tracker-Illuminator System (TIS) redesign in order to respond to obsolescence issues affecting ESSM systems on all CVN, LHA, and LHD class ships.

9. MK 73 Transmitter Replacement Initiative enables the MK 73 Transmitter to continue supporting self-defense mission requirements and pace emerging threats. The MK 73 Transmitter Replacement Initiative eliminates obsolescence issues and increases power output to provide improved tracking performance and higher ESSM probability of guidance on target. The MK 73 Transmitter replacement is required to field ESSM on CVNs 79, 80, and 81 with options available for future use on CVN 78, LHD 3, and LHD 5. The Transmitter replacement is required as the MK 73 Transmitter is unprocurable in its current design (MK 73 MOD 3).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Evolved Sea Sparrow Missile (ESSM) Blk 1 Testing | 5.000 | 7.414 | 8.163 | 0.000 | 8.163 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct CVN 78 Waterfront Integration Tests on SDTS and lead ship and participate in CSSQT with BLK1. Continue supporting Aegis ACB16 live fire testing. Continue operational flight tests for DDG 1000 and CVN 78 combat systems on SDTS and lead ship. Participate in the planning and execution of ZUMWALT CSSQT. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The program is expected to support Waterfront Integration Test (WIT) events on DDG 1000 and CVN 78, as well as 20 firings from DDG 1000, 20 firings from CVN 78, 6 additional CSSQTS, and development of the AEGIS and CVN test beds.<br>***FY 2020 Base Plans:***<br>Continue supporting Aegis ACB 16 live fire testing with Block 1 missiles. Support DDG 1001 CSSQT live fire. Continue to support CVN 78 and DDG 1000 live fire events and CSSQT. Conduct live fire supporting CSSQTs on LHD 7. Start Waterfront Integration Testing on SDTS, testing Ship Self-Defense System (SSDS) Fire Control Improvement Process (FCLIP) phase 2, and conduct live fire events.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase to support Aegis ACB, DDG 1001 CSSQT live fire, and continued CVN 78 and DDG 1000 live fire events. | | | | | |
| ***Title:*** NATO Sea Sparrow Combat System Integraton Technical Direction Agent (TDA) | 0.313 | 0.323 | 0.330 | 0.000 | 0.330 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The TDA will utilize their in-house integrated combat system analysis tools to conduct forward looking analyses and provide performance assessment of the MK 9 Tracker Illuminator System (TIS) and the Mk 29 Guided Missile Launching System (GMLS). Additionally, In FY19, further efforts are expected in the area of engineering support and risk mitigation planning associated with ESSM BLK 2 integration and SSDS ACB 20. TDA will provide continued support for launcher Min-Mod. Specifically, the TDA will complete design of new loading equipment, finalize the technical data package, and manufacture a developmental unit to facilitate qualification testing.<br>***FY 2020 Base Plans:***<br>TDA will continue to conduct forward looking analyses, provide performance assessments, and provide engineering support and risk mitigation planning. TDA expertise will be leveraged to define requirements for a replacement radar system, and to evaluate options for a complete replacement and upgrade of the Mk 29 launcher. NSPO has submitted a POM 21 issue for both of these initiatives.<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase in FY 2020 due to escalation from FY 2019. | | | | | |
| ***Title:*** Evolved Sea Sparrow Missile (ESSM) Blk 2 EMD | 105.310 | 57.614 | 23.460 | 0.000 | 23.460 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue maturing the ESSM Block 2 design during the EMD phase of the program focusing on S/W and H/W development. Complete GTV-2 and follow-on CFT (if needed), execute Milestone C review, and complete Developmental Test (DT) Tactical S/W build. Conduct DT flight testing. Prepare for Operational Flight Test to include build-up of Operational Test (OT) flight-test rounds, prepare for Functional Configuration Audit.<br><br>***FY 2020 Base Plans:***<br>Conduct Initial Operational Test & Evaluation (IOT&E) deployment aboard a DDG-51 Class Guided Missile Destroyer:<br><br>Waterfront Integration Test (WIT), Pre-deployment crew training, shipment of test rounds to Naval Weapons Station Seal Beach, California, Point Mugu Sea Range support, target preparation and expenditure, Telemetry data collection and analysis, photographic data collection, and post flight reconstruction and reporting.<br><br>Conduct Modeling and Simulation runs for record in support of system performance characterization and operational evaluation.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decreased amount represents the remaining US amount required to fulfill their 40% of the total EMD cost obligation per the ESSM BLK2 EMD Memorandum of Understanding (MOU). | | | | | |
| ***Title:*** I-Stalker | 2.399 | 3.626 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Complete final I-Stalker design | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Complete hardware fabrication of EDM<br>- Complete software updates and execute performance/qualification testing.<br>- Perform transition to production.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>I-Stalker RDT&E effort ends in FY2019. | | | | | |
| ***Title:*** Dual Band Transceiver (DBT) | 1.799 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** BLK 2 Follow-on Test & Evaluation (FOT&E) | 0.000 | 0.000 | 15.530 | 0.000 | 15.530 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>The ESSM Blk 2 Milestone Decision Authority mandated that ESSM Blk 2 conduct FOT&E on SSDS platform and fully support DDG flight III operational testing. This is for US Sole Combat Systems integration testing including but not limited to: Aegis Baseline 10 integration, Ship Self-Defense System (SSDS) integration, and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| other potential (future Frigate) platform integration testing as required. This includes development of appropriate ESSM Block 2 missile simulators with Raytheon Missile System operator support.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Begin transitioning from EMD to Follow-On Test & Evaluation (FOT&E) and combat systems integration efforts outside of those tested during the EMD phase. | | | | | |
| ***Title:*** Transition to Production (TTP) | 14.217 | 16.923 | 18.840 | 0.000 | 18.840 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>TTP will be preparing for the LRIP activities associated with Test Equipment (TE) procurement, installation, prove-in, and integration for Circuit Card Assembly (CCA), Sub Assembly, and Section level missile hardware. ESSM BLK2 is a Consortium funded Program; this is the United States' obligation to fulfilling transition to Full Rate Production (FRP) under the Memorandums of Understanding.<br>***FY 2020 Base Plans:***<br>Preparation for production will continue into FY 2020. Equipment procured in 2019 to support LRIP will be installed, proved-in, and integrated at RMS facilities. Upgrades to support FRP, including TE required for All Up Round testing and further capacity upgrades to section level production lines will occur. Additionally, lead-in activities will begin to support the execution of the FRP PRR. ESSM BLK2 is a Consortium funded Program; this fulfills the United States' obligation to transition to FRP under the Memorandums of Understanding.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase represents the remaining US amount required to fulfill Blk 2 TTP shared consortium development efforts. | | | | | |
| ***Title:*** BLK 2 Obsolescence and Redesign | 0.000 | 0.000 | 7.000 | 0.000 | 7.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 Base Plans:***<br>Explore missile launcher and MK 9 Tracker-Illuminator System (TIS) redesign in order to respond to obsolescence issues affecting ESSM systems on all CVN, LHA, and LHD class ships.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase to begin exploring missile launcher and MK 9 Tracker-Illuminator System (TIS) redesign. | | | | | |
| ***Title:*** MK 73 Tracker-Illuminator System Continuous Wave Tracker Illuminator Replacement Initiative<br>***Articles:***<br>***FY 2019 Plans:***<br>Begin research and development efforts to initiate the non-recurring engineering (NRE) for the MK 73 Transmitter replacement. NRE efforts include identification of a prime contractor, modifying the interface to ensure seamless integration with existing MK 9 TIS elements, and beginning certification/qualification efforts for shipboard integration.<br>***FY 2020 Base Plans:***<br>Complete environmental qualification, complete MK 73 Transmitter replacement integration with MK 9 TIS and MK 57 NSSMS, and finalize MK 2 SSDS integration. Complete efforts to prepare, then install the MK 73 Transmitter replacement shipboard, and perform installation and checkout with the integrated MK 9 TIS.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding Increase from FY19 to FY20 due to completing efforts for preparation and installation of the MK 73 transmitter replacement. Additionally, completing efforts for installation and checkout with MK 9 TIS. | 0.000<br>- | 1.500<br>- | 5.550<br>- | 0.000<br>- | 5.550<br>- |
| **Accomplishments/Planned Programs Subtotals** | 129.038 | 87.400 | 78.873 | 0.000 | 78.873 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • WPN 2307: *ESSM* | 73.513 | 98.384 | 128.059 | - | 128.059 | 223.305 | 308.770 | 547.985 | 559.056 | Continuing | Continuing |
| • OPN 5231: *Ship Missile Defense* | 45.099 | 38.518 | 32.692 | - | 32.692 | 35.098 | 32.706 | 25.085 | 25.519 | Continuing | Continuing |
| • OMN 1D4D: *NATO Seasparrow* | 29.853 | 37.931 | 23.428 | - | 23.428 | 23.952 | 24.527 | 21.141 | 21.570 | 0.000 | 182.402 |

**Remarks**

OPN for Stalker is included in above LI 5231 - Ship Missile Defense line as follows: FY18: $6.268M, FY19: $10.435M, FY20: $8.9M, FY21: $4.5M, FY22: $4.5M.
OMN funding is for ESSM Blk 1, NSSMS, & RIM-7
**ESSM Blk 2 OMN funding not received, pending MOU signature**

**D. Acquisition Strategy**

ESSM Blk 2 EMD is a directed sole source contract to Raytheon Missile Systems Company.

I-Stalker: NSWC Crane to initiate and complete final design of hardware/software for integration of SAwS w/Stalker in preparation for sole source procurement (OPN) of Stalker Kits from the current design agent (Ball Aerospace) and SAwS Kits from NSWC Crane to meet CVN and LHD/LHA fleet deployment schedules.

**E. Performance Metrics**

Successfully conduct Developmental Testing/Operational Testing. Two ESSM Blk 2 Controlled Test Vehicle flight tests were successfully conducted in June 2017 onboard the Self Defense Test Ship at the Point Mugu Sea Range. Successful GTV-1 in June 2018. GTV-2 completed Oct. 2018. GTV-3 scheduled to occur by Q3 FY19. The ESSM Blk 2 Milestone C decision is scheduled for Q2 FY 2019 with Initial Operational Capability for AEGIS platforms scheduled for 2020 and SSDS platforms in 2023. ESSM Blk 2 Low Rate Initial Production deliveries are expected to begin in 2020 with Full Rate Production rounds delivering to the Fleet in 2023.

I-Stalker: Initiate and complete final design, successful performance/qualification testing and delivery of EDM.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0173 / *NATO Sea Sparrow* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESSM Systems Engineering/Firing Spt | WR | Corona : CA | 10.397 | 0.705 | Oct 2017 | 0.705 | Nov 2018 | 0.890 | Dec 2019 | - | | 0.890 | 0.000 | 12.697 | - |
| NATO OC System Engineering | C/ FFPLOE | Raytheon : RI | 1.955 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.955 | - |
| NATO OC - Software | C/ FFPLOE | Raytheon : RI | 8.054 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.054 | - |
| Stalker System Engineering | WR | NSWC Crane : IN | 4.782 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.782 | - |
| Stalker Hardware Engineering | WR | NSWC Crane : IN | 14.350 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 14.350 | - |
| Stalker Software Engineering | WR | NSWC Crane : IN | 2.725 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.725 | - |
| ESSM Primary Hardware Development | C/CPAF | Raytheon : Tuscon | 193.941 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 193.941 | - |
| ESSM Ancillary Hardware | Various | Various : Various | 71.324 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 71.324 | - |
| ESSM Blk 2 EMD | C/CPIF | Raytheon : Tuscon | 160.854 | 92.571 | Oct 2017 | 44.417 | Nov 2018 | 22.630 | Nov 2019 | - | | 22.630 | 0.000 | 320.472 | - |
| I-Stalker Systems Engineering | WR | NSWC Crane : Crane, IN | 0.000 | 1.288 | Mar 2018 | 1.617 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.905 | - |
| TTP | SS/FFP | Raytheon : Tuscon | 0.000 | 14.217 | May 2018 | 16.923 | Dec 2018 | 18.840 | Dec 2019 | - | | 18.840 | 0.000 | 49.980 | - |
| ESSM Blk 2 Risk reduction | SS/ FFPLOE | Raytheon : Tuscon | 44.150 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 44.150 | - |
| NATO OC Systems Engineering SPT | WR | NSWC PHD : CA | 0.700 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.700 | - |
| Dual Band Tranceiver | SS/FFP | Raytheon : Tuscon | 4.956 | 1.199 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.155 | - |
| MK 73 Tracker-Illuminator System Continuous Wave Tracker Illuminator Replacement Initiative | SS/FFP | TBD : TBD | 0.000 | 0.000 | | 1.500 | Jun 2019 | 5.556 | Nov 2019 | - | | 5.556 | 0.000 | 7.056 | - |
| BLK 2 Obsolescence and Redesign | SS/FFP | Raytheon : Tuscon | 0.000 | 0.000 | | 0.000 | | 7.000 | Jan 2020 | - | | 7.000 | 0.000 | 7.000 | - |
| | | **Subtotal** | 518.188 | 109.980 | | 65.162 | | 54.916 | | - | | 54.916 | 0.000 | 748.246 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0173 / *NATO Sea Sparrow* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NATO System TDA | SS/FP | APL : MD | 2.789 | 0.313 | Nov 2017 | 0.323 | Jan 2019 | 0.330 | Jan 2020 | - | | 0.330 | Continuing | Continuing | Continuing |
| NATO OC | SS/FFP | APL : MD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Stalker -ISEA/TDA/RM&A | SS/FFP | various : various | 0.750 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |
| ILS/Engineering Support | Various | Various : Various | 15.543 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.543 | - |
| ESSM Blk 2 EMD | WR | APL : MD | 11.951 | 4.218 | Oct 2017 | 4.285 | Oct 2018 | 0.828 | Dec 2019 | - | | 0.828 | 0.000 | 21.282 | - |
| ESSM Blk 2 EMD | WR | NAWC CL : CA | 15.204 | 5.914 | Nov 2017 | 6.197 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 27.315 | - |
| ESSM Blk 2 EMD | Various | Various : Various | 6.259 | 2.607 | Nov 2017 | 2.715 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 11.581 | - |
| I-Stalker Platform Integration | WR | Norfolk Naval Shipyard (NNSY) : Norfolk, VA | 0.000 | 0.100 | Jun 2018 | 0.300 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| I-Stalker Platform Integration | C/BA | NSWC Dahlgren : Dahlgren, VA | 0.000 | 0.232 | Mar 2018 | 0.300 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.532 | - |
| I-Stalker Platform Integration | C/BA | NSWC Crane : Crane, IN | 0.000 | 0.415 | Mar 2018 | 0.709 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.124 | - |
| I-Stalker Platform Integration | WR | PSNSY : Puget Sound, WA | 0.000 | 0.100 | Mar 2018 | 0.400 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| NATO OC Support | WR | Dahlgren : VA | 2.174 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.174 | - |
| Dual Band Transceiver | WR | APL : MD | 0.600 | 0.200 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.800 | - |
| Dual Band Tranceiver | WR | NAWC CL : CA | 1.200 | 0.400 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.600 | - |
| | | **Subtotal** | 56.470 | 14.499 | | 15.229 | | 1.158 | | - | | 1.158 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESSM Developmental Test & Evaluation | WR | NAWC CL : CA | 22.047 | 0.204 | Oct 2017 | 0.851 | Oct 2018 | 0.320 | Dec 2019 | - | | 0.320 | Continuing | Continuing | Continuing |
| ESSM OPEVAL/ TECHEVAL/Test Firings | WR | Corona, IHD, Dahlgren, SNSWC, PHD) : various | 18.403 | 0.285 | Nov 2017 | 1.500 | Nov 2018 | 2.041 | Nov 2019 | - | | 2.041 | 0.000 | 22.229 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0173 / *NATO Sea Sparrow* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESSM Developmental Test & Evaluation | SS/FFP | APL : MD | 5.882 | 0.100 | Oct 2017 | 0.500 | Oct 2018 | 3.500 | Oct 2019 | - | | 3.500 | Continuing | Continuing | Continuing |
| ESSM Test & Evaluation | C/CPAF | Raytheon : Tuscon | 19.917 | 3.118 | Nov 2017 | 1.000 | Nov 2018 | 9.188 | Nov 2019 | - | | 9.188 | Continuing | Continuing | Continuing |
| ESSM Test & Evaluation | WR | Dahlgren/PHD : VA/ CA | 2.714 | 0.372 | Nov 2017 | 1.098 | Nov 2018 | 3.298 | Oct 2019 | - | | 3.298 | 0.000 | 7.482 | - |
| Developmental Test & Evaluation | WR | Dahlgren : VA | 0.418 | 0.000 | | 0.000 | | 1.980 | Nov 2019 | - | | 1.980 | 0.000 | 2.398 | - |
| I-Stalker Development Test and Evaluation | WR | NSWC Crane : IN | 0.000 | 0.264 | Mar 2018 | 0.300 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.564 | - |
| | | **Subtotal** | 69.381 | 4.343 | | 5.249 | | 20.327 | | - | | 20.327 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESSM-Support and Performing Activity | Allot | PHD/NAWC CL/ APL : CA/MD | 14.995 | 0.116 | Oct 2017 | 1.660 | Oct 2018 | 2.272 | Oct 2019 | - | | 2.272 | Continuing | Continuing | Continuing |
| ESSM-Travel | Allot | Program Office : VA | 3.427 | 0.100 | Oct 2017 | 0.100 | Oct 2018 | 0.200 | Oct 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| ESSM-Misc | Various | various : various | 2.149 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.149 | 2.065 |
| NATO Travel/Misc | Various | Program Office : various | 2.111 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.111 | - |
| Engineering Support | Various | Various : Various | 5.458 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.458 | - |
| Need Item Text | C/BA | Not Specified : Not Specified | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 28.140 | 0.216 | | 1.760 | | 2.472 | | - | | 2.472 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 672.179 | 129.038 | | 87.400 | | 78.873 | | - | | 78.873 | Continuing | Continuing | N/A |

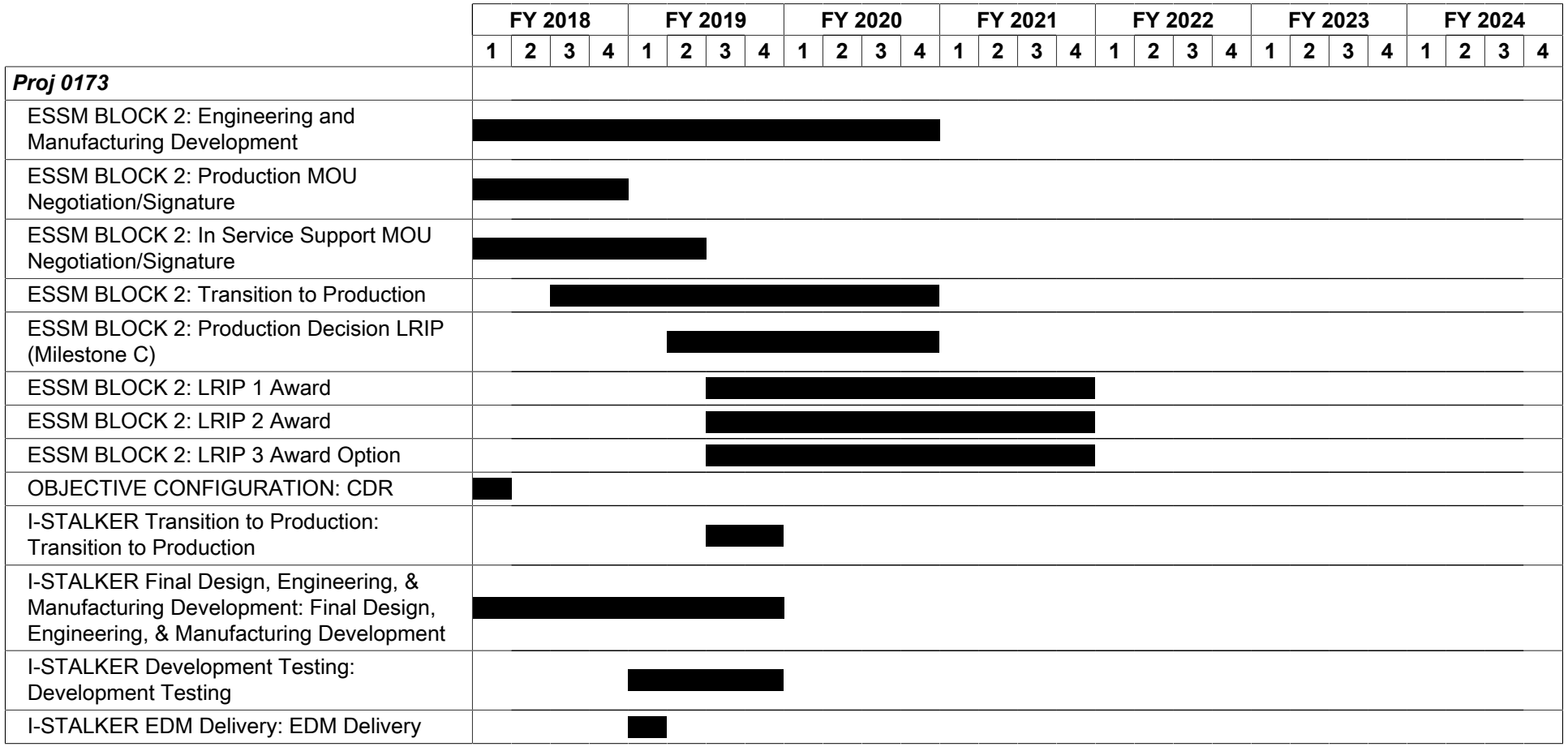
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0173 / *NATO Sea Sparrow* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Various used for multiple vendors and location under threshold.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0173 / *NATO Sea Sparrow* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0173*** | | | | |
| ESSM BLOCK 2: Engineering and Manufacturing Development | 1 | 2018 | 4 | 2020 |
| ESSM BLOCK 2: Production MOU Negotiation/Signature | 1 | 2018 | 4 | 2018 |
| ESSM BLOCK 2: In Service Support MOU Negotiation/Signature | 1 | 2018 | 2 | 2019 |
| ESSM BLOCK 2: Transition to Production | 3 | 2018 | 4 | 2020 |
| ESSM BLOCK 2: Production Decision LRIP (Milestone C) | 2 | 2019 | 4 | 2020 |
| ESSM BLOCK 2: LRIP 1 Award | 3 | 2019 | 4 | 2021 |
| ESSM BLOCK 2: LRIP 2 Award | 3 | 2019 | 4 | 2021 |
| ESSM BLOCK 2: LRIP 3 Award Option | 3 | 2019 | 4 | 2021 |
| OBJECTIVE CONFIGURATION: CDR | 1 | 2018 | 1 | 2018 |
| I-STALKER Transition to Production: Transition to Production | 3 | 2019 | 4 | 2019 |
| I-STALKER Final Design, Engineering, & Manufacturing Development: Final Design, Engineering, & Manufacturing Development | 1 | 2018 | 4 | 2019 |
| I-STALKER Development Testing: Development Testing | 1 | 2019 | 4 | 2019 |
| I-STALKER EDM Delivery: EDM Delivery | 1 | 2019 | 1 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0243 / *ALaMO* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0243: *ALaMO* | 5.594 | 35.041 | 24.714 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 65.349 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The 57mm MK 332 HE-4G Projectile significantly increases MK 110 Gun Mount lethality and effectiveness against Fast Attack Craft and Fast In-Shore Attack Craft (FAC/FIAC). The 57mm ALaMO concluded development as part of a classified program and transitioned to qualification for Navy use in FY 2017. ALaMO will transition to production at the conclusion of the program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Engineering and Testing | 35.041 | 24.714 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Procure balance of hardware for DT assets.<br>Conduct remaining performance verification test.<br>Conduct hazard classification and insentitive munitions qualification.<br>Conduct remaining safety and suitability environmental qualification tests.<br>Build DT test assets<br>Conduct land based and shipboard DT events.<br>Conduct Weapons System Explosives Safety Review Board reviews for qualification closure.<br>Conduct Weapons System Explosives Safety Review Board reviews for DT events. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>There is no RDT&N funding planned for FY2020 as the program is transitioning to production. Funding for ALaMO beyond FY2019 will be PANMC via the Intermediate Caliber Ammunition Budget Line Item. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 35.041 | 24.714 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0243 / *ALaMO* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PANMC/0266: *INTERMEDIATE CALIBER GUN AMMO HE-4G* | 0.000 | 19.494 | 19.494 | - | 19.494 | 20.306 | 28.151 | 21.126 | 29.289 | 0.000 | 137.860 |

**Remarks**

Profile only reflects procurement of CART 57MM ALaMO (HE-4G).

**D. Acquisition Strategy**

MK 332 HE-4G will be completed qualifications and transition into LRIP FY2019.

**E. Performance Metrics**

Quarterly Program Reviews and semi-annual Product Certification Panel Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>0243 / *ALaMO* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Produce Design Verification hardware, DT Hardware | MIPR | DOTC : PICATINNY ARSENAL, NJ | 5.000 | 31.408 | Jan 2018 | 20.097 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 56.505 | 49.300 |
| | | **Subtotal** | 5.000 | 31.408 | | 20.097 | | 0.000 | | - | | 0.000 | 0.000 | 56.505 | N/A |

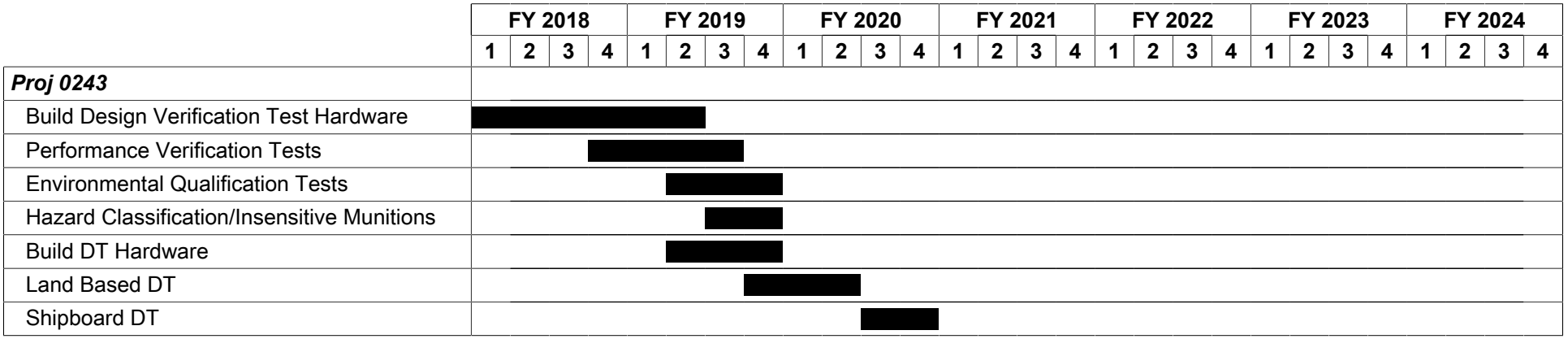
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Services | WR | NSWC, DD : Dahlgren, VA | 0.493 | 3.227 | Oct 2017 | 2.965 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 6.685 | - |
| Government Engineering Services | WR | NSWC, IHEODTD : Indian Head, MD | 0.101 | 0.406 | Oct 2017 | 1.652 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.159 | - |
| | | **Subtotal** | 0.594 | 3.633 | | 4.617 | | 0.000 | | - | | 0.000 | 0.000 | 8.844 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 5.594 | 35.041 | | 24.714 | | 0.000 | | - | | 0.000 | 0.000 | 65.349 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0243 / *ALaMO* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>0243 / *ALaMO* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0243*** | | | | |
| Build Design Verification Test Hardware | 1 | 2018 | 2 | 2019 |
| Performance Verification Tests | 4 | 2018 | 3 | 2019 |
| Environmental Qualification Tests | 2 | 2019 | 4 | 2019 |
| Hazard Classification/Insensitive Munitions | 3 | 2019 | 4 | 2019 |
| Build DT Hardware | 2 | 2019 | 4 | 2019 |
| Land Based DT | 4 | 2019 | 2 | 2020 |
| Shipboard DT | 3 | 2020 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>2070 / *OTH Missile* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2070: *OTH Missile* | 0.000 | 0.000 | 19.968 | 28.039 | - | 28.039 | 26.392 | 11.206 | 8.288 | 0.000 | 0.000 | 93.893 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Over-The-Horizon (OTH) Missile funds competitive acquisition, testing, and fielding of a modern, technologically mature Over-the-Horizon Weapon System (OTH-WS) surface to surface missile capability to be installed onto commissioned and in-production Littoral Combat Ship /Frigate(LCS/FFG(X)) beginning in FY 2021.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** OTH-WS Test and Evaluation and Systems Engineering | 0.000 | 19.968 | 28.039 | 0.000 | 28.039 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Execute and initiate Over-the-Horizon Weapon System (OTH-WS) ship engineering activities, to include installation<br>planning and design configuration on both Independence and Freedom LCS platforms.<br>-Receive approval on OTH-WS required acquisition milestone documentation in accordance with DoD 5000.2.<br>-Develop OTH-WS artifacts to support combat/system certifications required prior to system installation aboard LCS class<br>ships.<br>-Perform OTH-WS test and evaluation activities to include procurement of test assets, conduct of scenario working groups<br>and development of firing scripts.<br>-Initiate Test Planning Activities (Development and Operational testing (DT-OT), Environments, Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC), Qualifications, etc.).<br>-Execute OTH-WS logistics requirements to include, the development of maintenance plans, inventory management<br>conceptualization, movement of equipment and asset movement coordination, identification and coordination of ordnance<br>storage facilities, development of maintenance cards, and development of ordnance handling and loading procedures.<br>-Provide overarching OTH-WS subject matter expertise to assist the program office with carrying out the surface to surface | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>2070 / *OTH Missile* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| missile mission.<br>-Begin OTH-WS Weapon System Explosives Safety Review Board (WSESRB) coordination and planning efforts (Software<br>Systems Safety Technical Review Panel (SSSTRP), Fuse and Initiation System Technical Review Panel (FISTRP), Hazard<br>of Electromagnetic Radiation to Ordnance (HERO), and Insensitive Munitions (IM)).<br>-Begin the Element Certification Planning, Production Engineering efforts Ship Change Document (SCD), Interface control<br>Document (ICD) preparation, production processes and factory acceptance familiarization, cyber planning, ship interfaces/combat system familiarization).<br>-Start Fleet training planning (Facility, Naval Training System Plan (NTSP) development).<br>-Fund the initial Original Equipment Manufacturer (OEM) Design Agent Support. | | | | | |
| ***FY 2020 Base Plans:***<br>-Continue Over-the-Horizon Weapon System (OTH-WS) ship engineering activities to include installation planning and design configuration on both LCS and FFG(X) platforms.<br>-Procure test articles (missiles, targets, components) required to support the OTH-WS Test and Evaluation Master Plan (TEMP).<br>-Safety Testing - In FY20 the OTH-WS program will execute Electro-Magnetic Environmental Effects (E3) testing to include Electro-Magnetic Interference (EMI), Electro-magnetic Compatibility (EMC), and Electro-Magnetic Vulnerability (EMV). Additionally, Insensitive Munitions (IM) testing will be executed in accordance with the OTH-WS test plan. IM testing includes fast/slow energetics cook offs, bullet / fragment impact testing, sympathetic reaction testing, and missile drop tests.<br>-Qualification Testing - In FY20 the OTH-WS test program will execute required environmental testing to include shock / vibration testing, low / high /cycling temperature testing, humidly testing, rain / salt / fog / sand & dust testing.<br>-Performance testing - In FY20 the OTH-WS test program will execute required performance testing to include Seeker Discrimination Testing, restrained firing, warhead lethality testing, and survivability (Radar Cross Section (RCS), measurement testing, flight termination testing etc.) testing.<br>-Coordinate and perform all OTH-WS logistics activities in accordance with maintenance / inventory management plans, coordinate movement of OTH-WS equipment and track asset movements to/from shipyards and ordnance storage facilities, and coordinate the handling and loading of OTH-WS equipment at the waterfront and other locations as applicable. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>2070 / *OTH Missile* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Provide OTH-WS missile and fire control subject matter expertise to support the program office with program execution.<br>- Implement organic Navy OTH-WS training capability in accordance with the Naval Training System Plan (NTSP).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase in FY20 RDT&E funds is to support critical OTH-WS test execution activities related to safety, system qualifications, and performance testing. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 19.968 | 28.039 | 0.000 | 28.039 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN/0603599/3086: *Frigate / OTH Missile System* | 11.594 | 1.232 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 16.059 |
| • OPN /5231: *Ship Missile Support Equipment/OTH Missile* | 0.000 | 2.874 | 1.800 | - | 1.800 | 3.694 | 5.656 | 5.621 | 5.642 | 0.000 | 25.287 |
| • WPN 2292: *LCS OTH Missile* | 0.000 | 18.156 | 38.137 | - | 38.137 | 32.975 | 33.585 | 49.371 | 50.451 | 0.000 | 222.675 |
| • OPN /1604: *LCS IN-SERVICE MOD LN004* | 9.348 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.348 |

**Remarks**

**D. Acquisition Strategy**

The OTH-WS is an Acquisition Category (ACAT) II level weapon system production and sustainment program to provide the current Littoral Combat Ship (LCS) variants and Frigate (FFG(X)) ships with an Over-the-Horizon Surface-To-Surface Missile (SSM) capability. The Navy awarded a competitive contract on May 31, 2018.

**E. Performance Metrics**

Performance metrics include awarding the Low Rate Initial Production (LRIP) 2 contract option for the OTH-WS, achieving a successful System Performance Verification Testing and initial Qualification Testing and Integrating training courses and materials into LCS schoolhouses. Additionally, the program office will continue installation planning and design configuration on required ship platforms (LCS/FFG), supporting combat/system certifications required prior to system installation, test

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>2070 / *OTH Missile* |

planning activities to include; SSSTRP, FISTRP, Quick Reaction Assessment (QRA) and Operational Testing (OT), and the development and integration of logistics support requirements for the OTH-WS.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>2070 / *OTH Missile* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTH All Up Round (AUR) Technical Design Agent | WR | NAWC/WD : China Lake, CA | 0.000 | 0.000 | | 1.366 | Oct 2018 | 2.259 | Oct 2019 | - | | 2.259 | 0.000 | 3.625 | - |
| OTH Simulation and Analysis | WR | NSWC/COR : Corona, CA | 0.000 | 0.000 | | 0.290 | Oct 2018 | 0.290 | Oct 2019 | - | | 0.290 | 0.000 | 0.580 | - |
| OTH Weapon System Design Agent | WR | NSWC/DD : Dahlgren, VA | 0.000 | 0.000 | | 0.525 | Oct 2018 | 0.800 | Oct 2019 | - | | 0.800 | 0.000 | 1.325 | - |
| OTH Test & Evaluation / ILS | WR | NSWC/PHD : Port Hueneme, CA | 0.000 | 0.000 | | 0.750 | Oct 2018 | 1.832 | Oct 2019 | - | | 1.832 | 0.000 | 2.582 | - |
| OTH Weapon System Safety | WR | NSWC/DD : Dahlgren, VA | 0.000 | 0.000 | | 0.220 | Oct 2018 | 0.500 | Oct 2019 | - | | 0.500 | 0.000 | 0.720 | - |
| Weapons Systems Engineering Planning | SS/CPFF | JHU/APL : Laurel, MD | 0.000 | 0.000 | | 0.462 | Dec 2018 | 0.600 | Dec 2019 | - | | 0.600 | 0.000 | 1.062 | - |
| OEM Engineering Support | C/CPFF | Raytheon : Tucson, AZ | 0.000 | 0.000 | | 3.200 | Nov 2018 | 1.000 | Nov 2019 | - | | 1.000 | 0.000 | 4.200 | - |
| Test & Evaluation Assets | C/FFP | Raytheon : Tucson, AZ | 0.000 | 0.000 | | 12.000 | Nov 2018 | 15.638 | Nov 2019 | - | | 15.638 | 0.000 | 27.638 | - |
| Range & Target | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 4.100 | Oct 2019 | - | | 4.100 | 0.000 | 4.100 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 18.813 | | 27.019 | | - | | 27.019 | 0.000 | 45.832 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTH Contractor Acquisiton Mgt Suppt | C/CPIF | CACI : Arlington, VA | 0.000 | 0.000 | | 0.320 | Dec 2018 | 0.320 | Dec 2019 | - | | 0.320 | 0.000 | 0.640 | - |
| OTH Program Management Support | C/CPIF | Strategic Insight : Arlington, VA | 0.000 | 0.000 | | 0.100 | Dec 2018 | 0.100 | Dec 2019 | - | | 0.100 | 0.000 | 0.200 | - |
| OTH Program Management Support | WR | PEO IWS : Arlington, VA | 0.000 | 0.000 | | 0.100 | Oct 2018 | 0.100 | Oct 2019 | - | | 0.100 | 0.000 | 0.200 | - |
| OTH Contractor Engineering Support | C/CPIF | Alion/ECS/GDIT : Arlington, VA | 0.000 | 0.000 | | 0.635 | Dec 2018 | 0.500 | Dec 2019 | - | | 0.500 | 0.000 | 1.135 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>2070 / *OTH Missile* |

**Management Services ($ in Millions)**

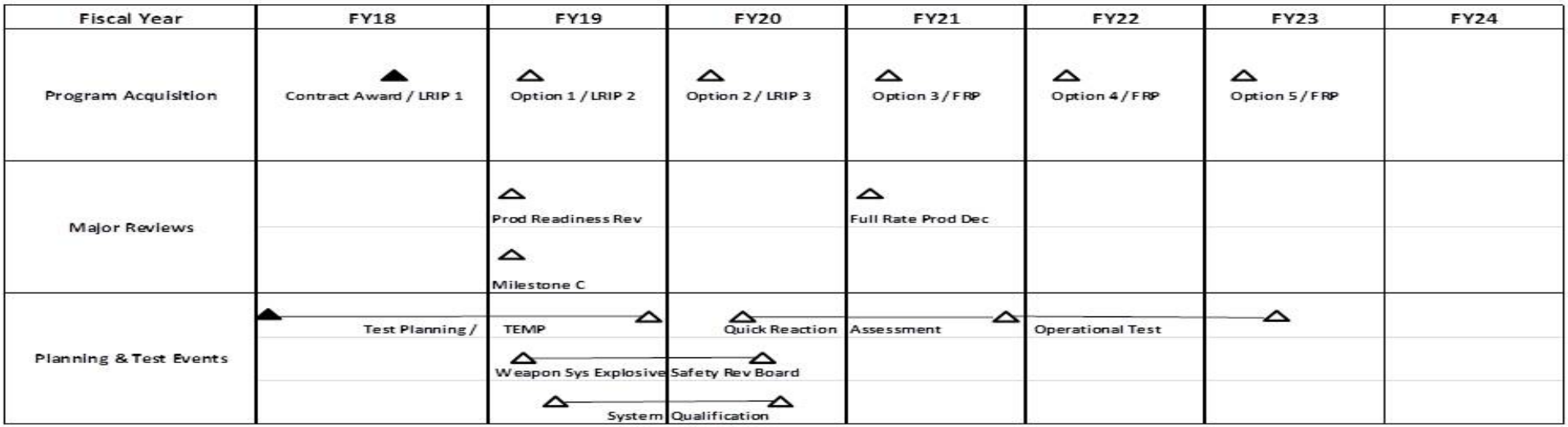
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 0.000 | 0.000 | | 1.155 | | 1.020 | | - | | 1.020 | 0.000 | 2.175 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 19.968 | | 28.039 | | - | | 28.039 | 0.000 | 48.007 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>2070 / *OTH Missile* |

# Over The Horizon-Weapon System

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>2070 / *OTH Missile* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2070*** | | | | |
| Test Planning Activities (TEMP, Environments, EMC/EMI, Qualifications) | 1 | 2018 | 4 | 2019 |
| Maintenance Planning (ISEA, ILSP development, ILA support) | 1 | 2018 | 4 | 2018 |
| Contract Award / LRIP 1 | 3 | 2018 | 3 | 2018 |
| Contract Option 1 Award / LRIP 2 | 1 | 2019 | 1 | 2019 |
| Major Review - Production Readiness Review | 1 | 2019 | 1 | 2019 |
| Major Review - Milestone C Decision | 1 | 2019 | 1 | 2019 |
| Weapon System Explosives Safety Review Board Planning & Execution (SSSTRP, FISTRP, HERO, IM) | 2 | 2019 | 3 | 2020 |
| System Qualification | 2 | 2019 | 3 | 2020 |
| Contract Option 2 Award / LRIP 3 | 1 | 2020 | 1 | 2020 |
| Quick Reaction Assessment | 3 | 2020 | 4 | 2021 |
| Full Rate Production (FRP) Decision | 1 | 2021 | 1 | 2021 |
| Contract Option 3 Award / FRP | 1 | 2021 | 1 | 2021 |
| Operational Testing | 4 | 2021 | 3 | 2023 |
| Contract Option 4 Award / FRP | 1 | 2022 | 1 | 2022 |
| Contract Option 5 Award / FRP | 1 | 2023 | 1 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>9081 / *Phalanx CIWS SEARAM* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9081: *Phalanx CIWS SEARAM* | 7.144 | 10.433 | 9.882 | 8.400 | - | 8.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 35.859 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The MK 15 Close-In Weapons System (CIWS) is a fast reaction, rapid fire, computer controlled radar system utilizing either a 20mm gun (Phalanx) or a SeaRAM weapon system (SeaRAM) to meet its primary mission of providing Anti-Ship Missile (ASM) defense. CIWS fleet population exceeds 220 systems onboard nearly every USN surface combatant. In addition, CIWS continues to be installed on new construction surface ships with life expectancies of 25+ years. Basic system architecture is 20+ years old, hasn't had a significant R&D development effort since the 1990's, and is in need of Technology Refresh in order to avoid hardware obsolescence, maintain/improve reliability, increase capability, and provide affordable spare parts to achieve acceptable Operational Availability for the next 20+ years. Technology Refresh development started in FY 2018 and will be fielded during CIWS overhauls and will consist of three efforts: Electric Gun Drive System (EGDS), Electronics Enclosure Modernization (ELX), and Local Control Station and Remote Control Station (LCS/RCS) Redesign. EGDS will replace the current pneumatic gun drive system that is difficult and costly to maintain with an all-electric drive system. EGDS will reduce maintenance/troubleshooting requirements, reduce support costs, and provide capability increases such as variable firing rates and reduced ammunition expenditures. ELX replaces costly and obsolete 1970's technology circuit card assemblies, servo controllers and electronic drawer backplanes with COTS digital devices, integrated controllers, and efficient power converters. ELX also will provide a reduction in weight of approx 960 lbs and simplified maintainability. LCS/RCS Redesign eliminates expensive obsolete components, decreases maintenance requirements and complexity, increases commonality between the LCS and RCS via open architecture, and simplifies the user operation by reducing Human Machine Interface requirements.

In August 2018, CIWS Tech Refresh efforts for ELX and LCS/RCS were postponed outside FYDP; direction was provided to complete EGDS FY18-20. CIWS Tech Refresh efforts cancelled FY21-FY24.

SeaRAM CIWS is deployed onboard Rota DDG's in order to provide additional capability to meet emerging threats. Efforts include development, qualification, and testing of software and hardware modifications in order to support fielding on these AEGIS class ships.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** CIWS Tech Refresh | 10.428 | 9.872 | 8.390 | 0.000 | 8.390 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete Electric Gun PDR and CDR. Acquire and test prototype hardware. Begin development of mission control computer Electric Gun software. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9081 / *Phalanx CIWS SEARAM* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete development of mission computer and electric gun software. Complete integration and testing of Proof of manufacture hardware. Conduct test readiness review and complete qualification. Complete ECP.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease from FY2019 to FY2020 is due to electric gun development efforts ramping down for qualification and completion of the ECP in FY20. | | | | | |
| ***Title:*** CIWS Travel | 0.005 | 0.010 | 0.010 | 0.000 | 0.010 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Fund program office travel to support program/testing as required by program schedule and in accordance with travel reduction mandate.<br>***FY 2020 Base Plans:***<br>Fund program office travel to support program/testing as required by program schedule and in accordance with travel reduction mandate.<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.433 | 9.882 | 8.400 | 0.000 | 8.400 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The MK 15 Close-In Weapons System (CIWS) is a fast reaction, rapid fire, computer controlled radar system utilizing either a 20mm gun (Phalanx) or a SeaRAM weapon system (SeaRAM) to meet its primary mission of providing Anti-Ship Missile (ASM) defense. Funding provides support for efforts related to Technology Refresh (for current fleet population) as well as efforts related to the integration/installation of SeaRAM CIWS in DDG 64, 71, 75, and 78. This work will be completed via sole source contracts to the CIWS Design Agent (Raytheon Missile Systems). Tech Refresh improvements will be fielded as Engineering Change Proposals (ECPs) and will be installed during CIWS overhauls or pierside.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9081 / *Phalanx CIWS SEARAM* |

**E. Performance Metrics**

Successfully complete trade studies and initial requirements definition for Technology Refresh and efforts related to successful integration/installation of SeaRAM CIWS in DDG class ships.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9081 / *Phalanx CIWS SEARAM* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CIWS Tech Refresh | SS/CPFF | Raytheon Missile Systems : Tucson, AZ | 4.435 | 9.400 | Jul 2018 | 9.232 | Dec 2018 | 7.620 | Dec 2019 | - | | 7.620 | 0.000 | 30.687 | 4.435 |
| SeaRAM CIWS on DDG Class | SS/CPFF | Raytheon Missile Systems: : Various | 2.309 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.309 | - |
| CIWS Tech Refresh | Various | Various : Various | 0.400 | 0.000 | Jul 2018 | 0.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.400 | - |
| CIWS Tech Refresh | WR | NAWC CL : CA | 0.000 | 0.085 | Apr 2018 | 0.075 | Jan 2019 | 0.180 | Dec 2019 | - | | 0.180 | 0.000 | 0.340 | - |
| CIWS Tech Refresh | WR | NSWC DD : VA | 0.000 | 0.050 | Apr 2018 | 0.040 | Jan 2019 | 0.040 | Dec 2019 | - | | 0.040 | 0.000 | 0.130 | - |
| CIWS Tech Refresh | WR | NSWC IHD : MD | 0.000 | 0.450 | Apr 2018 | 0.250 | Jan 2019 | 0.250 | Dec 2019 | - | | 0.250 | 0.000 | 0.950 | - |
| CIWS Tech Refresh | C/BA | APL : MD | 0.000 | 0.125 | Jun 2018 | 0.025 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| CIWS Tech Refresh | WR | TECH REP : CA | 0.000 | 0.085 | Sep 2018 | 0.100 | Jan 2019 | 0.150 | Dec 2019 | - | | 0.150 | 0.000 | 0.335 | - |
| CIWS Tech Refresh | SS/CPFF | TSC : VA | 0.000 | 0.000 | | 0.150 | Dec 2018 | 0.150 | Dec 2019 | - | | 0.150 | 0.000 | 0.300 | - |
| CIWS Tech Refresh | WR | NSWC CCD : Not Specified | 0.000 | 0.012 | Oct 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.012 | - |
| CIWS Tech Refresh | SS/CPFF | ALION : VA | 0.000 | 0.221 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.221 | - |
| | | **Subtotal** | 7.144 | 10.428 | | 9.872 | | 8.390 | | - | | 8.390 | 0.000 | 35.834 | N/A |

**Remarks**

CIWS Tech Refresh modernization activities are focused on redesign of key subsystems, some of which date to the 1970s with obsolete and largely unsupportable electronics systems. Replacing these subsystems with modular "refreshed" components will reduce total ownership costs and maintenance requirements for the overall sustainment of the Phalanx system.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | Program Office: : VA | 0.000 | 0.005 | Oct 2017 | 0.010 | Dec 2018 | 0.010 | Dec 2019 | - | | 0.010 | 0.000 | 0.025 | - |
| | | **Subtotal** | 0.000 | 0.005 | | 0.010 | | 0.010 | | - | | 0.010 | 0.000 | 0.025 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>9081 / *Phalanx CIWS SEARAM* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7.144 | 10.433 | | 9.882 | | 8.400 | | - | | 8.400 | 0.000 | 35.859 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9081 / *Phalanx CIWS SEARAM* |

| | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| ***Proj 9081*** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tech Refresh: CIWS Research, Development, and Test for Tech Refresh | [redacted] | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9081 / *Phalanx CIWS SEARAM* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9081*** | | | | |
| Tech Refresh: CIWS Research, Development, and Test for Tech Refresh | 1 | 2018 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 25.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 25.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Three Congressional adds are funded. C468 for Condition Based Maintenance to support forecasting and scheduling of maintenance; C469 for Next Generation PHALANX for MK 15 CIWS; and C470 ALaMO Munition System: The 57mm MK 332 HE-4G Projectile significantly increases MK 110 Gun Mount lethality and effectiveness against Fast Attack Craft and Fast In-Shore Attack Craft (FAC/FIAC). The 57mm ALaMO concluded development as part of a classified program and transitioned to qualification for Navy use in FY 2017. ALaMO will transition to production at the conclusion of the program.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Condition Based Maintenance<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Project C468: Condition Based Maintenance program, originally developed for the LCS program, leverages work already done for LCS and AEGIS. It aides in forecasting and scheduling planned maintenance. Increase support for combat systems Condition Based Maintenance (CBM+) in the Evolved Sea Sparrow Missile System (ESSM), thereby enhancing three ship classes simultaneously - CVN, LHA and LHD. | 0.000 | 8.000 |
| ***Congressional Add:*** Next Generation Phalanx<br>***FY 2018 Accomplishments:*** NA<br>***FY 2019 Plans:*** Project C469: The Navy currently does not have any mount design efforts planned for FY19. The program office is working with the prime contractor to define which efforts might align with the Navy's plans for the MK 15 Close-In Weapons System (CIWS). | 0.000 | 7.000 |
| ***Congressional Add:*** Alamo Munition Systems<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Project C470<br>-Complete transition to production activities.<br>-Procure hardware for Counter Unmanned Aerial Systems (CUAS) evaluation.<br>-Conduct gun fired CUAS demonstration. | 0.000 | 10.000 |
| **Congressional Adds Subtotals** | 0.000 | 25.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

C470 ALaMO Munition System: MK 332 HE-4G will have completed qualifications and transition into LRIP FY2019.

**E. Performance Metrics**

C470 ALaMO Munition System: Quarterly Reviews and semi-annual Product Certification Panel Reviews.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C470- Produce test hardware and production transition | MIPR | DOTC : Picatinny Arsenal, NJ | 0.000 | 0.000 | | 8.000 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 8.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 8.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.000 | N/A |

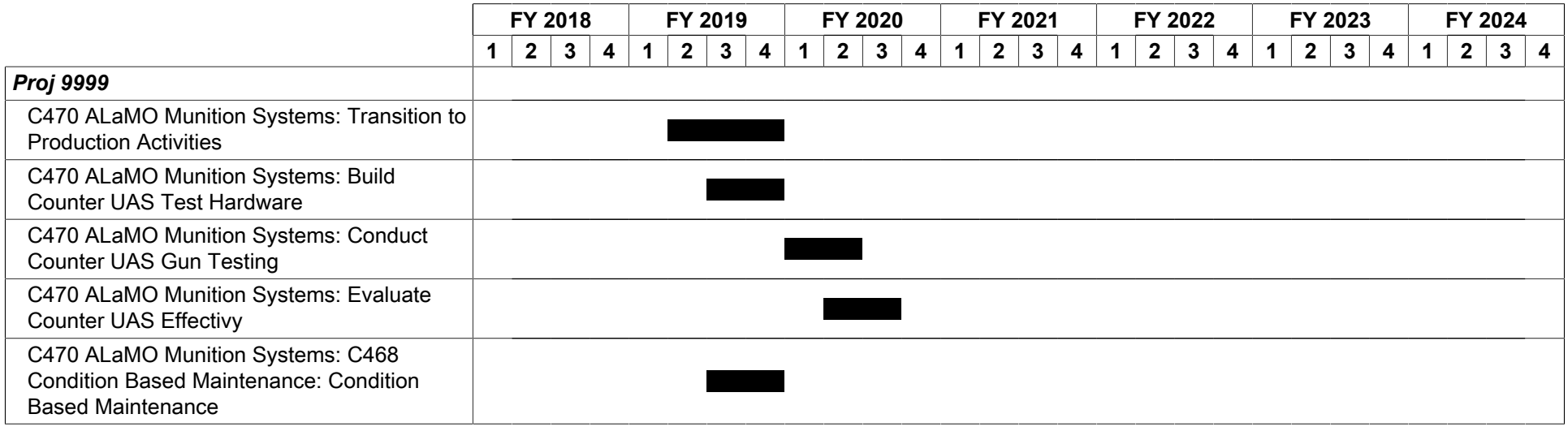
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C470-Government Engineering Support Services | WR | NSWC DD : NSWC Dahlgren, VA | 0.000 | 0.000 | | 2.000 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.000 | - |
| C468- Condition Based Maintenance | C/FFP | MIkros Systems : NA | 0.000 | 0.000 | | 8.000 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 8.000 | - |
| C469-CIWS Improvements | SS/CPFF | Raytheon : Various | 0.000 | 0.000 | | 7.000 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 7.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 17.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 25.000 | | 0.000 | | - | | 0.000 | 0.000 | 25.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604756N / *Ship Self Def (Engage: Hard Kill)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| C470 ALaMO Munition Systems: Transition to Production Activities | 2 | 2019 | 4 | 2019 |
| C470 ALaMO Munition Systems: Build Counter UAS Test Hardware | 3 | 2019 | 4 | 2019 |
| C470 ALaMO Munition Systems: Conduct Counter UAS Gun Testing | 1 | 2020 | 2 | 2020 |
| C470 ALaMO Munition Systems: Evaluate Counter UAS Effectivy | 2 | 2020 | 3 | 2020 |
| C470 ALaMO Munition Systems: C468 Condition Based Maintenance: Condition Based Maintenance | 3 | 2019 | 4 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604757N *I Ship Self Def (Engage: Soft Kill/EW)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 448.945 | 126.037 | 120.210 | 97.363 | - | 97.363 | 111.380 | 80.616 | 71.048 | 61.160 | Continuing | Continuing |
| 0954: *Shipboard EW Improvement Program* | 38.500 | 5.707 | 15.664 | 15.865 | - | 15.865 | 16.080 | 16.419 | 16.723 | 17.060 | Continuing | Continuing |
| 2190: *NULKA Decoy* | 39.246 | 4.181 | 3.975 | 5.090 | - | 5.090 | 5.286 | 6.965 | 7.050 | 7.197 | Continuing | Continuing |
| 3316: *Advanced Offboard EW* | 120.922 | 39.836 | 64.694 | 54.279 | - | 54.279 | 25.521 | 10.226 | 10.320 | 10.516 | Continuing | Continuing |
| 3321: *SEWIP Block 3* | 250.277 | 76.313 | 35.877 | 22.129 | - | 22.129 | 22.893 | 6.906 | 6.955 | 7.087 | Continuing | Continuing |
| 3430: *SEWIP Block 4* | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 41.600 | 40.100 | 30.000 | 19.300 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

0954 - The Surface Electronic Warfare Improvement Program (SEWIP) is segmented into Block 1A, Block 1B, Block 2, Block 3, Block 4 and Soft Kill Coordination System (SKCS). Block 1A upgraded the AN/SLQ-32 pulse-processing computers and the display consoles allowing the system to more quickly identify threats and better display the information to the operator. Block 1B added adjunct sensors for special signal intercept, including Specific Emitter Identification (SEI), and High Gain High Sensitivity (HGHS) (Block 1B3), a critical improvement for the threat correlation, situational awareness, and extending the battle space. Block 2 enhanced Surface Electronic Warfare (EW) and provided improved Anti-Ship Missile Defense (ASMD) and Situational Awareness (SA) through an improved Electronic Support (ES) receiver, antenna, and combat system interface. The addition of Block 2 to Block 1B3 forms the AN/SLQ-32 (V)6. Block 3 will provide an enhanced Electronic Attack (EA) capability to improve ASMD and counter-targeting. The addition of Block 3 to AN/SLQ-32 (V)6 forms the AN/SLQ-32(V)7 system. SEWIP Block 4 provides improved ASMD and SA through Electro-Optical(EO)/Infrared (IR) to ES and EA countermeasures. EW Rapid Capability Insertion Process (RCIP) identifies system and mission capability gaps by analyzing EW baseline and fleet requirements, prioritizes those gaps based on fleet input and critical technology maturity, and develops upgrades to the AN/SLQ-32(V) product line to address those gaps. The SKCS will provide SK weapon coordination and enhanced situational awareness to the AN/SLQ-32 (V)6 with EW/radar track association to support SK engagement decisions, including Radar Cued Engagements (RCE) and EA with both onboard EA, provided by AN/SLQ-32 (V)7, and off-board EA. RCIP also integrates Future Naval Capability (FNC) programs into SEWIP.

2190 - The Offboard Active Decoy (NULKA) is a joint cooperative program between the United States and Australia that developed an active offboard decoy that utilizes a broadband radio frequency repeater mounted atop a hovering rocket. NULKA is designed to counter a wide variety of present and future radar guided Anti-Ship Missiles (ASMs) by radiating a large radar cross section while flying a ship-like trajectory. The United States developed the electronic payload and fire control system, while Australia developed the hovering rocket. Future efforts involve development of the capability for high value unit protection. Increased funding beginning in FY 2020 is required to support Decoy Launch Processor (DLP) technology refresh to address hardware obsolescence and support top side design, RCS analysis, the development of new tactics and fly-out tables for new ship class.

3316 - The Advanced Offboard EW (AOEW) program is for the development of long duration off-board decoys integrated with onboard systems for EW coordination to counter identified EW gaps (additional details classified) in response to an urgent operational need from the Fleet that has been approved by the CNO for execution. Currently no counter to the threat exists. In FY 2012, the program began with a Rapid Response Effort (RRE) which was completed in FY 2014. The RRE consisted of

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604757N *I Ship Self Def (Engage: Soft Kill/EW)* |

the evaluation and integration of commercially available decoys. The Decoy Development Effort (DDE) consists of the development and evaluation of a long duration, active electronic offboard decoy system (payload) integrated on an existing flight vehicle (MH-60R/MH-60S), integration with ship and air systems, and a government software development effort to integrate AOEW into the Soft Kill Coordination System (SKCS) to gain maximum effectiveness from the decoy through coordination with an onboard system.

The DDE Preliminary Design contract was awarded Dec 2016 followed by a System Requirements Review (SRR)/System Functional Review (SFR) leading to a Preliminary Development Review (PDR) all in FY17. The Engineering Manufacturing and Development (EMD) Option was awarded in Sep 2017. Following the arrival of Engineering Development Model (EDMs) the Factory Qualification Test (FQT) will be completed to support development testing and NAVAIR flight certification. Initial Operational Test & Evaluation (IOT&E) is planned in FY 2022 to support the Full Rate Production (FRP) decision in FY 2022.

Due largely to program funding reductions in FY 2017 and FY 2018, the program schedule for DDE testing and MH-60R/S flight certification has been revised. Completion of developmental and operational testing has been delayed from FY 2019 to FY 2020 and FY 2021 to FY 2022, respectively.

3321 - SEWIP Block 3 is developing an Electronic Attack (EA) capability improvement required for the AN/SLQ-32(V) system to keep pace with the threat. SEWIP Block 3 will provide the AN/SLQ-32(V)7 system for all surface ships (CVN, DDG, LHD) outfitted with the active variant of the AN/SLQ-32, mainly the (V)3 and (V)4, as well as select new construction platforms.

The SEWIP Block 3 Acquisition leverages technology developed under the Office of Naval Research's (ONR) Integrated Topside (InTop) Science and Technology (S&T) effort. SEWIP Block 3 will continue to expand the integrated shipboard combat system by providing a new integrated EA transmitter, array, and associated EA techniques. The AN/SLQ-32(V)7 integrates the new EA countermeasure (SEWIP Block 3) with the AN/SLQ-32(V)6. The AN/SLQ-32(V)6 includes an Electronic Support(ES) receiver (SEWIP Block 2), a High Gain High Sensitivity (HGHS) receiver (SEWIP Block 1B3), a Specific Emitter Identifier (SEI) receiver (SEWIP Block 1B2), display console, and backend electronics. SEWIP Block 3 includes a government software development and integration effort for a SoftKill Coordinator (SKC) to manage EA engagements. SEWIP Block 3 is developing an Electronic Warfare Test Bed (EWTB) to validate system performance.

3430 - SEWIP Block 4 will provide an Electro-optic/Infrared (EO/IR), Electronic Support (ES) and Electronic Attack (EA) capability required for US Navy ships to keep pace with the threat. SEWIP Block 4 will provide a common EO/IR surveillance and countermeasure capability to all surface combatants and non-combatants outfitted with SEWIP variants AN/SLQ-32(V)6 and (V)7 as well as select new construction platforms.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604757N *I Ship Self Def (Engage: Soft Kill/EW)* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 103.391 | 120.507 | 97.029 | - | 97.029 |
| Current President's Budget | 126.037 | 120.210 | 97.363 | - | 97.363 |
| Total Adjustments | 22.646 | -0.297 | 0.334 | - | 0.334 |
| • Congressional General Reductions | - | -0.297 | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 30.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -2.163 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.565 | - | -0.565 |
| • Rate/Misc Adjustments | 0.001 | 0.000 | 0.899 | - | 0.899 |
| • Congressional General Reductions Adjustments | -0.192 | - | - | - | - |
| • Congressional Directed Reductions Adjustments | -5.000 | - | - | - | - |

**Change Summary Explanation**

FY2018 funding increase of $30.000M for SEWIP Block 3 development.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>0954 / *Shipboard EW Improvement Program* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0954: *Shipboard EW Improvement Program* | 38.500 | 5.707 | 15.664 | 15.865 | - | 15.865 | 16.080 | 16.419 | 16.723 | 17.060 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

0954 - The Surface Electronic Warfare Improvement Program (SEWIP) is segmented into Block 1A, Block 1B, Block 2, Block 3, Block 4 and Soft Kill Coordination System (SKCS). Block 1A upgraded the AN/SLQ-32 pulse-processing computers and the display consoles allowing the system to more quickly identify threats and better display the information to the operator. Block 1B added adjunct sensors for special signal intercept, including Specific Emitter Identification (SEI), and High Gain High Sensitivity (HGHS) (Block 1B3), a critical improvement for the threat correlation, situational awareness, and extending the battle space. Block 2 enhanced Surface Electronic Warfare (EW) and provided improved Anti-Ship Missile Defense (ASMD) and situational awareness (SA) through an improved Electronic Support (ES) receiver, antenna, and combat system interface. The addition of Block 2 to Block 1B3 forms the AN/SLQ-32 (V)6. Block 3 will provide an enhanced electronic attack (EA) capability to improve ASMD and counter-targeting. The addition of Block 3 to AN/SLQ-32 (V)6 forms the AN/SLQ-32(V)7 system. SEWIP Block 4 provides improved ASMD and SA through Electro-Optical(EO)/Infrared (IR) to ES and EA countermeasures. EW Rapid Capability Insertion Process (RCIP) identifies system and mission capability gaps by analyzing EW baseline and fleet requirements, prioritizes those gaps based on fleet input and critical technology maturity, and develops upgrades to the AN/SLQ-32(V) product line to address those gaps. The SKCS will provide SK weapon coordination and enhanced situational awareness to the AN/SLQ-32 (V)6 with EW/radar track association to support SK engagement decisions, including Radar Cued Engagements (RCE) and EA with both onboard EA, provided by AN/SLQ-32 (V)7, and off-board EA. RCIP also integrates Future Naval Capability (FNC) programs into SEWIP.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Electronic Warfare Rapid Capability Insertion Process (EW RCIP) | 5.707 | 15.664 | 15.865 | 0.000 | 15.865 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue RCIP #4 SKCS integration efforts with AN/SLQ-32 to address platform gaps for automatic and semi-automatic engagements using Nulka decoys and the onboard Electronic Attack (EA) (AN/SLQ-32 (V)7) and offboard EA systems; Initiate and complete software development and system integration and testing activities to deliver software builds, which provide capabilities including early HK/SK coordination, enhanced offboard EW communication, and architecture updates to support compliance with new Aegis baselines; Continue integration and testing activities in support of AEGIS ACB 16 baseline by completing element certification in support of AEGIS ACB BL 9.2.1 (Phase 1), while starting Combat System (CS) integration with AEGIS ACB BL 9.2.2 (Phase 2) in support of the Baseline 9.2.2 demonstration; Complete SKCS Formal Qualification Testing (FQT) | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>0954 / *Shipboard EW Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| for a software build in support of AN/SLQ-32(V)6 FQT, and participate in system integration events with AN/SLQ-32(V)6, AN/SLQ-32(V)7 and Offboard EW; Begin SSDS ACB 20 integration support efforts.<br>- Continue the transition of the Future Naval Capability (FNC) program, Softkill Performance and Real-Time Assessment (SPARTA) into SKCS; Complete early requirements tracing and analysis. Develop algorithms to measure key features observed in Softkill (SK) engagements and measure EA effectiveness; Develop algorithms to provide real-time assessment of SK performance to SEWIP; Initiate the development of improved fleet weapons coordination, informed Hard Kill(HK)/SK prioritization, weapons conservation, and enhanced operator battlespace awareness by contributing integral feedback regarding non-kinematic performance; Develop and update the interface, architecture and algorithms required for transition into SKCS; Continue to assess the results and readiness of the SPARTA demonstration for transition into an SKCS Build.<br>- Continue RCIP #5 improvements to increase EW Tactical Simulation (TACSIM) capabilities to include system integration with Ship Self Defense System (SSDS), SKCS, ACB-16, and the onboard Surface Electronic Warfare Team Trainer (SEWTT); Complete TACSIM Phase 3 effort by implementing the improvements through integration and testing, installation, and verification of completed upgrades. Complete the efforts to incorporate AN/SLQ-(V)6 Build 6 with SKCS, and the enhanced combat system simulation supporting training for SKCS scenarios with tracking and response tactics for incoming threats. Initiate TACSIM Phase 4 development efforts to integrate new EA systems into the tactical training programs.<br>- Continue SEWTT development: enhance the trainer to include the systems engineering and development of additional SKCS, Nulka, and Offboard EW capabilities; Develop updated and enhanced SLQ-32 operator training to ensure effective countermeasure deployment against incoming threats.<br>- Develop threat simulators with realistic front end to baseline FNC program Combined EO/IR Surveillance and Response System (CESARS) to support SEWIP EO/IR testing capability. Conduct laboratory and field test with actual systems and simulator to validate CESARS design requirement. Assess the results and technology level readiness of CESARS program to inform acquisition decision. Initiate the S&T effort with SKCS to ensure the software is developed in compliance with SKCS architecture. Initiate development of the interface, architecture, and ship integration for CESARS to support development of SEWIP capability improvements.<br>- Initiate design and development of Electronic Support (ES) system enhancements for AN/SLQ-32(V)6 and AN/SLQ-32(V)7 to provide advanced EW capabilities; Develop techniques that address new evolving threats, including the capabilities to sense dynamic radio frequency environments and generate an improved response to enhance ship survivability; Initiate development of a prototype for technique testing and demonstration of the ability to integrate and perform with the ship's systems.<br>- Identify additional EW technology shortfalls and capability gaps based on the current and emerging ASM threats and fleet requirements; solicit industry, University Affiliate Research Centers or government activities for | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>0954 / *Shipboard EW Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| technical solutions; Evaluate and select RCIP technology candidates; Evaluate RCIP technologies production readiness. | | | | | |
| ***FY 2020 Base Plans:***<br>- Continue RCIP #4 SKCS efforts to address platform gaps for automatic and semi-automatic engagements using Nulka decoys, onboard Electronic Attack (EA) (AN/SLQ-32 (V)7), and offboard EA systems; Initiate and complete software development and system integration and testing activities for delivery of completed software builds with capabilities including HK/SK coordination and enhanced capabilities for onboard EA and offboard EA coordination, including automatic association and classification techniques; Continue integration and testing activities in support of AEGIS ACB 16 baseline by completing element certification in support of AEGIS ACB BL 9.2.2 (Phase 2); Complete SKCS FQT for a software build in support of AN/SLQ-32(V)6 FQT, and continue to participate in system integration events with AN/SLQ-32(V)6, AN/SLQ-32(V)7 and Offboard EW; Continue SSDS ACB 20 integration support efforts.<br>- Continue the transition of the Future Naval Capability (FNC) program, Softkill Performance and Real-Time Assessment (SPARTA) into SKCS; Utilize developed algorithms to measure key features observed in Softkill (SK) engagements and EA effectiveness and perform real-time assessment of SK performance. Complete the development of improved fleet weapons coordination, informed Hard Kill (HK)/SK prioritization, weapons conservation, and enhanced operator battlespace awareness by continuing to contribute integral feedback regarding non-kinematic performance. Continue to develop and update the interface, architecture and algorithms required for full transition into SKCS, taking into account ongoing SKCS build and capability completions. Continue to assess the results and readiness of the SPARTA demonstration for transition into an SKCS Build.<br>- Continue RCIP #5 improvements to increase EW Tactical Simulation (TACSIM) capabilities to include system integration with Ship Self Defense System (SSDS), SKCS, ACB-16, and the onboard Surface Electronic Warfare Team Trainer (SEWTT); Complete the TACSIM Phase 4 effort, including expansion of the Phase 3 technology to add SLQ-32(V)7 support, add Advanced Offboard Electronic Warfare (AOEW) support, and upgrade Surface Electronic Warfare Team Trainer (SEWTT) software to support countermeasure training; Complete test and evaluation and integration with external stakeholders. Complete the implementation of developed improvements through integration and testing, installation, and verification of completed upgrades, delivering the final system for EW operator use on the Common Processing System (CPS)/Common Display System (CDS) station.<br>- Continue SEWTT development of trainer enhancements including additional SKCS, Nulka, and Offboard EW capabilities; Continue testing, integration, and documentation of the enhanced trainer and update associated training materials. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>0954 / *Shipboard EW Improvement Program* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Complete development of additional threat simulators for FNC CESARS program. Complete laboratory and at-sea test with actual systems and simulator to validate CESARS design requirements. Complete SKCS pre-design material to include CESARS capability. Finalize the interface, architecture, and ship integration for CESARS transition into the SEWIP program.<br>- Complete the design, development, and testing of Electronic Support (ES) system enhancements for AN/SLQ-32(V)6 and AN/SLQ-32(V)7 to provide advanced EW capabilities; Complete the development of techniques that address new evolving threats, including the capabilities to sense dynamic radio frequency environments and generate an improved response to enhance ship survivability; Complete the prototype to test the techniques, and demonstrate the technique effectiveness and readiness for integration with the ship's software.<br>- Identify additional EW technology shortfalls and capability gaps based on the current and emerging ASM threats and fleet requirements; solicit industry, University Affiliate Research Centers or government activities for technical solutions; Evaluate and select RCIP technology candidates; Evaluate RCIP technologies production readiness.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>- Increase in FY 2020 due to minor program and rate adjustments. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 5.707 | 15.664 | 15.865 | 0.000 | 15.865 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2312: *OPN BA-2 AN/SLQ-32(V)* | 233.237 | 366.147 | 420.154 | - | 420.154 | 546.922 | 415.784 | 399.808 | 347.341 | 2,359.812 | 6,108.679 |
| • 24575N & 72827N/1C1C: *OMN BA-1 AN/SLQ-32(V)* | 7.827 | 6.622 | 6.115 | - | 6.115 | 5.156 | 5.253 | 5.359 | 5.464 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The Rapid Capability Insertion Process (RCIP) is a process that identifies candidate capability gap/technology solution pairs, refines the value proposition description for each pair, prioritizes projects for funding and executes projects that result in improved capability transitioned to the fleet.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>0954 / *Shipboard EW Improvement Program* |

**E. Performance Metrics**

Successfully identify RCIP capabilities.
Successfully identify and assess RCIP Science & Technology candidates.
Successfully demonstrate and validate RCIP capabilities.
Complete SKCS Builds in accordance with the Agile Software Development process.
Complete installation of TACSIM upgrades.
Transition the Future Naval Capability program Softkill Performance and Real-Time Assessment (SPARTA) into SKCS.
Complete ADEPT integration efforts with AN/SLQ-32(V)6 systems.
Complete AN/SLQ-32(V)6 and V(7) Software Algorithm Enhancements.
Successfully develop and demonstrate SEWTT capabilities.
Successfully demonstrate the readiness of CESARS for transition into SEWIP.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>0954 / *Shipboard EW Improvement Program* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RCIP #4 SKCS | SS/CPFF | APL : Laurel, MD | 2.896 | 1.372 | Nov 2017 | 2.188 | Dec 2018 | 2.150 | Nov 2019 | - | | 2.150 | Continuing | Continuing | Continuing |
| RCIP #4 SKCS | WR | NSWC Dahlgren : Dahlgren, VA | 6.548 | 0.906 | Nov 2017 | 4.105 | Nov 2018 | 4.239 | Nov 2019 | - | | 4.239 | Continuing | Continuing | Continuing |
| RCIP #5 TACSIM | WR | NSWC Dahlgren : Dahlgren, VA | 2.350 | 1.177 | Nov 2017 | 2.297 | Dec 2018 | 2.661 | Nov 2019 | - | | 2.661 | Continuing | Continuing | Continuing |
| SEWTT Development | SS/CPFF | EWA : Fairmont, WV | 0.100 | 0.259 | Apr 2018 | 1.018 | Dec 2018 | 0.900 | Nov 2019 | - | | 0.900 | Continuing | Continuing | Continuing |
| ATRT | C/CPIF | Information Defense Technologies (IDT) : Arlington, VA | 0.000 | 0.200 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| CESARS | WR | NRL : Washington, DC | 0.000 | 0.000 | | 1.010 | Dec 2018 | 1.805 | Nov 2019 | - | | 1.805 | 0.000 | 2.815 | - |
| | | **Subtotal** | 11.894 | 3.914 | | 10.618 | | 11.755 | | - | | 11.755 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 1 Government Engineering Support | WR | NSWC Dahlgren : Dahlgren, VA | 6.612 | 0.378 | Nov 2017 | 0.649 | Nov 2018 | 0.677 | Nov 2019 | - | | 0.677 | Continuing | Continuing | Continuing |
| Block 1 Government Engineering Support | WR | NSWC Crane : Crane, IN | 5.214 | 0.081 | Nov 2017 | 0.565 | Dec 2018 | 0.431 | Nov 2019 | - | | 0.431 | Continuing | Continuing | Continuing |
| Block 1 Government Engineering Support | WR | NRL : Washington, DC | 3.813 | 0.149 | Nov 2017 | 0.376 | Dec 2018 | 0.226 | Nov 2019 | - | | 0.226 | Continuing | Continuing | Continuing |
| Block 1 Government Engineering Support | SS/CPFF | APL : Laurel, MD | 2.865 | 0.000 | | 0.670 | Dec 2018 | 0.508 | Nov 2019 | - | | 0.508 | Continuing | Continuing | Continuing |
| Block 1 Engineering and AN/SLQ-32(V)6 and (V)7 Software Algorithm Enhancements | MIPR | MIT : Hanscom AFB, MA | 0.635 | 0.435 | Jun 2018 | 1.188 | Dec 2018 | 1.401 | Nov 2019 | - | | 1.401 | Continuing | Continuing | Continuing |
| Block 1 Government Engineering Support | MIPR | DISA : Fort Meade, MD | 0.000 | 0.050 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.050 | - |
| | | **Subtotal** | 19.139 | 1.093 | | 3.448 | | 3.243 | | - | | 3.243 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>0954 / *Shipboard EW Improvement Program* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RCIP Test Planning/T&E Events | WR | NSWC Dahlgren : Dahlgren, VA | 1.896 | 0.320 | Nov 2017 | 0.565 | Nov 2018 | 0.282 | Nov 2019 | - | | 0.282 | Continuing | Continuing | Continuing |
| RCIP Test Planning/T&E Events | WR | NSWC Crane : Crane, IN | 0.889 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.889 | - |
| RCIP Test Planning/T&E Events | WR | NRL : Washington, DC | 1.729 | 0.000 | | 0.330 | Dec 2018 | 0.230 | Nov 2019 | - | | 0.230 | Continuing | Continuing | Continuing |
| RCIP Test Planning/T&E Events | SS/CPFF | APL : Laurel, MD | 0.100 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| RCIP Test Planning/T&E Events | WR | COMOPTEVFOR : Norfolk, VA | 0.104 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.104 | - |
| | | **Subtotal** | 4.718 | 0.320 | | 0.895 | | 0.512 | | - | | 0.512 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 1 Program Management Support | C/CPIF | TMB (SEAPORT) : Washington, D.C. | 0.761 | 0.033 | Nov 2017 | 0.221 | Jan 2019 | 0.105 | Nov 2019 | - | | 0.105 | Continuing | Continuing | Continuing |
| Block 1 Program Management Support | C/CPIF | SPA : Washington, DC | 0.500 | 0.243 | Nov 2017 | 0.221 | Dec 2018 | 0.105 | Nov 2019 | - | | 0.105 | Continuing | Continuing | Continuing |
| Block 1 Program Managment Support | C/CPIF | CACI (SEAPORT) : Washington, DC | 0.165 | 0.064 | Nov 2017 | 0.221 | Jan 2019 | 0.105 | Nov 2019 | - | | 0.105 | 0.000 | 0.555 | - |
| Block 1 Travel | WR | NAVSEA Program Office Travel : Washington, DC | 1.323 | 0.040 | Nov 2017 | 0.040 | Dec 2018 | 0.040 | Nov 2019 | - | | 0.040 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.749 | 0.380 | | 0.703 | | 0.355 | | - | | 0.355 | Continuing | Continuing | N/A |

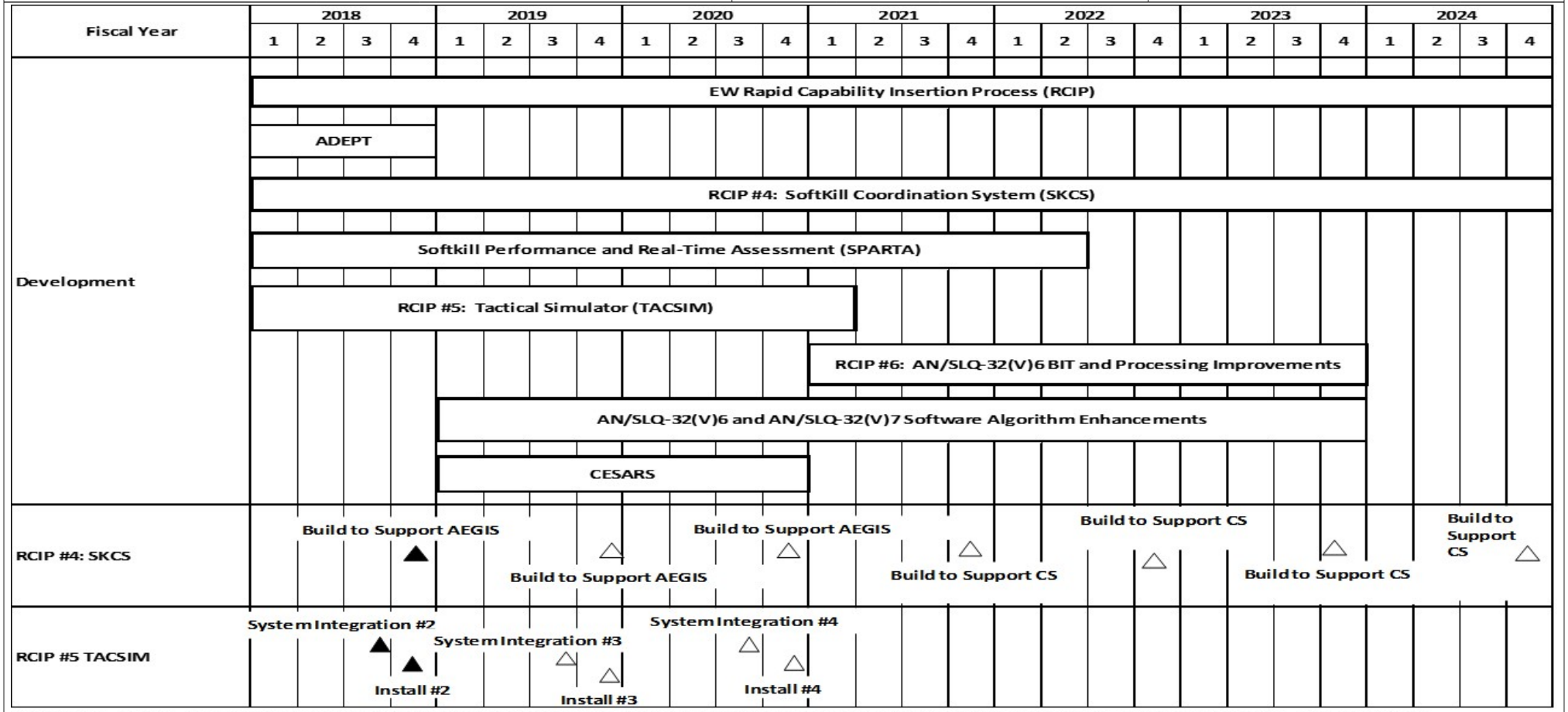
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 38.500 | 5.707 | | 15.664 | | 15.865 | | - | | 15.865 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>0954 / *Shipboard EW Improvement Program* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>0954 / *Shipboard EW Improvement Program* |




Acronyms: ADEPT - Algorithm Development of Enhanced Processing Techniques; CESARS - Combined EO/IR Surveillance and Response System; CS - Combat System

Note: RCIP #6 initiation was delayed from FY18 to FY21 due the realignment of $10M to SEWIP Block 3 (Project 3321) in 2018 and the addition of CESARS efforts in FY19-20.

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>0954 / *Shipboard EW Improvement Program* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0954*** | | | | |
| Algorithm Development of Enhanced Processing Techniques (ADEPT) | 1 | 2018 | 4 | 2018 |
| RCIP #5 TACSIM | 1 | 2018 | 1 | 2021 |
| Softkill Performance and Real-Time Assessment (SPARTA) | 1 | 2018 | 2 | 2022 |
| EW Rapid Capability Insertion Process (RCIP) | 1 | 2018 | 4 | 2024 |
| RCIP #4: SKCS | 1 | 2018 | 4 | 2024 |
| TACSIM System Integrations and Installs 2-4 | 3 | 2018 | 4 | 2020 |
| SKCS SW Builds | 4 | 2018 | 4 | 2024 |
| Combined EO/IR Surveillance and Response System (CESARS) | 1 | 2019 | 4 | 2020 |
| AN/SLQ-32(V)6 and AN/SLQ-32(V)7 Software Algorithm Enhancements | 1 | 2019 | 4 | 2023 |
| RCIP #6: AN/SLQ-32(V)6 BIT and Processing Improvements | 1 | 2021 | 4 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>2190 / *NULKA Decoy* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2190: *NULKA Decoy* | 39.246 | 4.181 | 3.975 | 5.090 | - | 5.090 | 5.286 | 6.965 | 7.050 | 7.197 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Offboard Active Decoy (NULKA) is a joint cooperative program between the United States and Australia that developed an active offboard decoy that utilizes a broadband radio frequency repeater mounted atop a hovering rocket. NULKA is designed to counter a wide variety of present and future radar guided Anti-Ship Missiles (ASMs) by radiating a large radar cross section while flying a ship-like trajectory. The United States developed the electronic payload and fire control system, while Australia developed the hovering rocket. Future efforts involve development of the capability for high value unit protection. Increased funding in FY 2020 required to support Decoy Launch Processor (DLP) technology refresh to address hardware obsolescence and support top side design, RCS analysis, the development of new tactics and fly-out tables for new ship class.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** NULKA Decoy Subsystem | 4.181 | 3.975 | 5.090 | 0.000 | 5.090 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue to evaluate intelligence on new and existing threats.<br>- Continue to update Nulka Fly Out Tactics to maximize performance and effectiveness.<br>- Continue Decoy Launch Processor (DLP) technology refresh to address obsolescence issues. | | | | | |
| ***FY 2020 Base Plans:***<br>- Continue to evaluate intelligence on new and existing threats.<br>- Continue to update Nulka Fly Out Tactics to maximize performance and effectiveness.<br>- Continue DLP technology refresh to address obsolescence issues.<br>- Commence tactics development, top side design, RCS analysis and fly-out tables for new ship class Fast Frigate Guided Missile (FFGX). | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>2190 / *NULKA Decoy* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increased funding in FY 2020 required to support Decoy Launch Processor (DLP) technology refresh to address hardware obsolescence and support top side design, RCS analysis, the development of new tactics and fly-out tables for new ship class. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.181 | 3.975 | 5.090 | 0.000 | 5.090 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5231: *Ship Missile Support Equipment* | 65.922 | 30.278 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN/5530: *Anti-Ship Missile Decoy System* | 0.000 | 0.000 | 41.962 | - | 41.962 | 60.212 | 60.793 | 71.036 | 72.749 | 537.538 | 844.290 |
| • OMN/11CD0 (1C1C): *Nulka* | 5.972 | 5.975 | 0.000 | - | 0.000 | 6.098 | 6.914 | 7.053 | 7.204 | Continuing | Continuing |

**Remarks**

OPN Controls reflect the following Line Item 5231 and 5530 Project Units (PU's) under the 'ANTI-SHIP MISSILE DECOY SYSTEM' program: VV001, VV002, VV003, VV004, and VV830.
Starting in FY 2020, Nulka funds have been realigned from BLI:5231 to BLI:5530.
$2.000 million of FY 2018 RDT&E was realigned from Nulka to SEWIP BLK 3 in order to prevent a stop work pending receipt of the FY 2018 Above Threshold Reprogramming (ATR)

**D. Acquisition Strategy**

NULKA is a joint cooperative program between United States and Australia in full rate production.

**E. Performance Metrics**

Successfully complete Decoy Launch Processor (DLP) technology refresh.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>2190 / *NULKA Decoy* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NRL : Washington, DC | 19.922 | 0.655 | Jan 2018 | 0.700 | Dec 2018 | 0.815 | Nov 2019 | - | | 0.815 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC Dahlgren : Dahlgren, VA | 11.467 | 2.058 | Nov 2017 | 2.551 | Dec 2018 | 1.854 | Nov 2019 | - | | 1.854 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NSWC Crane : IN | 6.805 | 0.858 | Nov 2017 | 0.204 | Dec 2018 | 1.927 | Nov 2019 | - | | 1.927 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 38.194 | 3.571 | | 3.455 | | 4.596 | | - | | 4.596 | Continuing | Continuing | N/A |

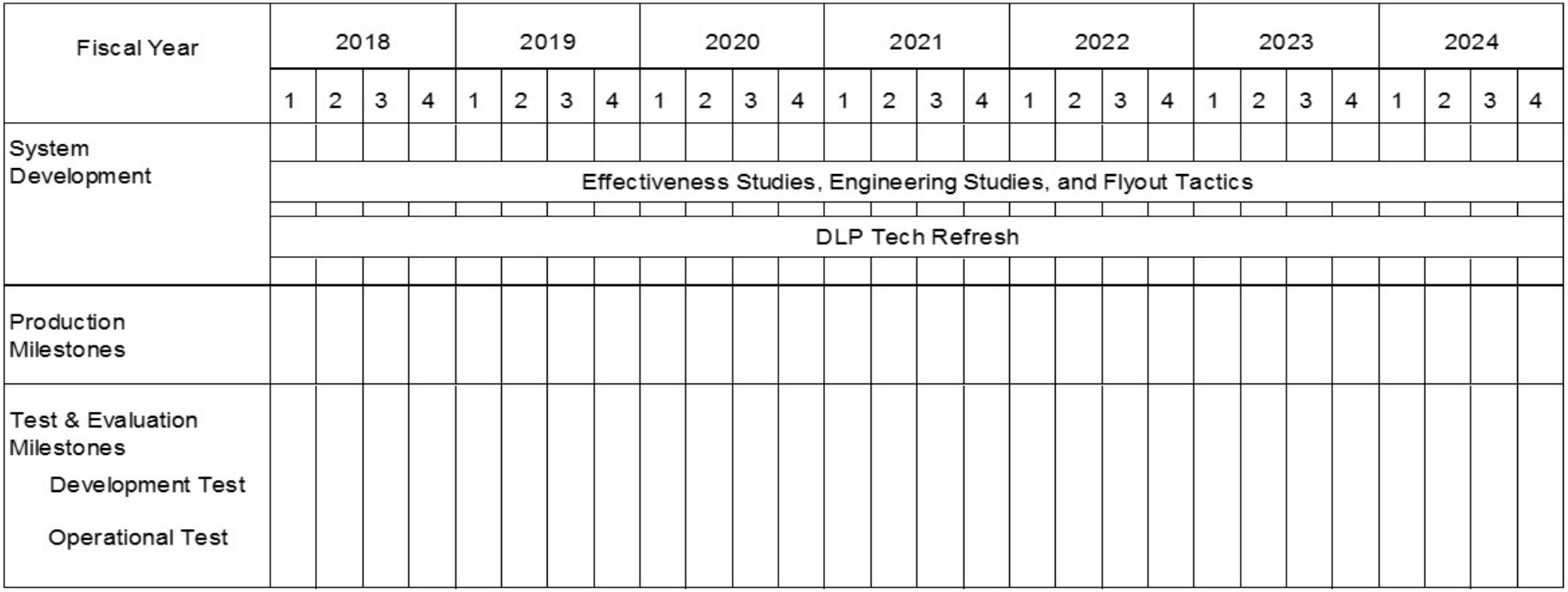
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPIF | ICI (SEAPORT) : Washington, DC | 0.121 | 0.100 | Feb 2018 | 0.102 | Jan 2019 | 0.104 | Nov 2019 | - | | 0.104 | 0.000 | 0.427 | - |
| Program Management Support | C/CPIF | TMB (SEAPORT) : Washington, DC | 0.153 | 0.210 | Feb 2018 | 0.102 | Jan 2019 | 0.104 | Nov 2019 | - | | 0.104 | 0.000 | 0.569 | - |
| Program Management Support | C/CPIF | SPA : Washington, DC | 0.095 | 0.300 | Dec 2018 | 0.306 | Dec 2018 | 0.276 | Nov 2019 | - | | 0.276 | 0.000 | 0.977 | - |
| Travel | WR | NAVSEA Program Office Travel : Washington, DC | 0.683 | 0.000 | | 0.010 | Nov 2018 | 0.010 | Nov 2019 | - | | 0.010 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.052 | 0.610 | | 0.520 | | 0.494 | | - | | 0.494 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 39.246 | 4.181 | | 3.975 | | 5.090 | | - | | 5.090 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>2190 / *NULKA Decoy* |




DLP - Decoy Launch Processor

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>2190 / *NULKA Decoy* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2190*** | | | | |
| Effectiveness Studies, Engineering Studies, and Flyout Tactics | 1 | 2018 | 4 | 2024 |
| DLP Tech Refresh | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3316 / *Advanced Offboard EW* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3316: *Advanced Offboard EW* | 120.922 | 39.836 | 64.694 | 54.279 | - | 54.279 | 25.521 | 10.226 | 10.320 | 10.516 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

3316 - The Advanced Offboard EW (AOEW) program is for the development of long duration off-board decoys integrated with onboard systems for EW coordination to counter identified EW gaps (additional details classified) in response to an urgent operational need from the Fleet that has been approved by the CNO for execution. Currently no counter to the threat exists. In FY12, the program began with a Rapid Response Effort (RRE) which was completed in FY 2014. The RRE consisted of the evaluation and integration of commercially available decoys. The Decoy Development Effort (DDE) consists of the development and evaluation of a long duration, active electronic offboard decoy system (payload) integrated on an existing flight vehicle (MH-60R/MH-60S), integration with ship and air systems, and a government software development effort to integrate AOEW into the Soft Kill Coordination System (SKCS) to gain maximum effectiveness from the decoy through coordination with an onboard system.

The DDE Preliminary Design contract was awarded Dec 2016 followed by a System Requirements Review (SRR)/System Functional Review (SFR) leading to a Preliminary Development Review (PDR) in FY 2017. The Engineering Manufacturing and Development (EMD) Option was awarded in Sep 2017. Following the arrival of Engineering Development Model (EDMs) the Factory Qualification Test (FQT) will be completed to support development testing and NAVAIR flight certification. Initial Operational Test & Evaluation (IOT&E) is planned in FY 2022 to support the Full Rate Production (FRP) decision in FY 2022.

Due largely to program funding reductions in FY17 and FY18, the program schedule for DDE testing and MH-60R/S flight certification has been revised. Completion of developmental and operational testing has been delayed from FY19 to FY20 and FY21 to FY22, respectively.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AOEW - Decoy Development Effort (DDE) Government Engineering | 16.501 | 25.509 | 40.967 | 0.000 | 40.967 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Commence MS-C planning and documentation preparation<br>- Conduct Integrated Logistics Assessment (ILA)<br>- Conduct Technology Readiness Assessment (TRA)<br>- Continue interoperability analysis to ensure all system of systems are compatible<br>- Continue tactics analysis and development<br>- Continue integration of ship and air interfaces<br>- Continue SKCS development specific to AOEW | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue development of Avionics Operating Program (AOP) to update MH-60R/S software necessary for AOEW decoy and Helicopter Integration<br>- Commence support of Trouble Report (TR) resolution for AOP software deliveries<br>- Continue integration planning and commence testing of AOEW, MH-60R/S, Combat Management System (CMS), Common Data Link Management System (CDLMS), SKCS, Link-16, and AOP<br>- Continue sustainment and training plan development<br>- Continue test and M&S plan development<br>- Continue support for M&S development for Electronic Warfare Test Bed (EWTB)<br>- Resume Surface Electronic Warfare Team Trainer (SEWTT) functionality development for the AOEW Decoy<br>- Support Factory Qualification Test (FQT) planning<br>- Commence support of DDE Test and Certification<br>- Support AOP PDR<br>- Support Developmental Test (DT) Assist planning<br>- Conduct technique verification<br>- Commence configuration management of Engineering Development Model (EDM) assets and baselines in support of programmatic needs<br>- Complete Engineering Data Requirements Agreement Plan (EDRAP) Development<br>- Commence NAVAIR MH-60R/S flight certification testing with mass models. Flight certification is required by NAVAIR to ensure Safety of Flight and to certify the interoperability between the MH-60R/S and the AOEW decoy. Flight certification tests include: Ground and Flight Jettison Test, Flight Test for Mission Performance / Spec Compliance Flight Test, Functional Software Test, and Decoy Fit and Egress Test<br>- Commence update of Capability Development Document (CDD)<br>- Conduct AEGIS integration planning to align program baselines<br>- Commence support for Production Readiness Review (PRR) planning<br>- Continue installation planning<br>- Commence battery certification | | | | | |
| ***FY 2020 Base Plans:***<br>- Complete MS-C planning documentation preparation<br>- Conduct MS-C<br>- Continue interoperability analysis to ensure all system of systems are compatible<br>- Continue tactics analysis and development<br>- Continue integration of ship and air interfaces | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue SKCS development specific to AOEW<br>- Complete development of AOP to update MH-60R/S software necessary for AOEW decoy and Helicopter Integration<br>- Continue support of Trouble Report (TR) resolution for AOP software deliveries<br>- Complete integration planning and continue testing of AOEW MH-60R/S, CMS, CDLMS, SKCS, Link-16 and AOP<br>- Continue sustainment and training plan development<br>- Commence identification of and update of test assets needed to support Operational Testing<br>- Continue test and M&S development for EWTB<br>- Continue SEWTT functionality development for the AOEW Decoy<br>- Support FQT<br>- Continue support of DDE Test and Certification<br>- Support DT Assist<br>- Continue technique verification<br>- Continue configuration management of Engineering Development Model (EDM) assets and baselines in support of programmatic needs<br>- Continue NAVAIR MH-60R/S flight certification testing of EDMs. Flight certification is required by NAVAIR to ensure Safety of Flight and to certify the interoperability between the MH-60R/S and the AOEW decoy. Flight certification tests include: Ground and Flight Jettison, Flight Test for Mission Performance / Spec Compliance Flight Test, Functional Software Test, and Decoy Fit and Egress Test<br>- Complete updates to CDD<br>- Support Production Readiness Review (PRR)<br>- Continue installation planning<br>- Support LRIP production<br>- Support and conduct Environmental/Electro Magnetic Interference (EMI) testing<br>- Complete battery certification | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase in Government Engineering funding in FY20 is due to completion of test planning and the start of extensive Government developmental testing and Hardware/Software integration EDMs 1 through 4 in FY20. | | | | | |
| ***Title:*** AOEW - Decoy Development Effort (DDE) Development | 23.335 | 39.185 | 13.312 | 0.000 | 13.312 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue E&MD<br>- Continue EDM Hardware and Software development and integration<br>- Procure material for EDMs 1 through 4<br>- Commence assembly of EDMs 1 through 4<br>- Commence planning of Factory Qualification Test (FQT) of EDM 1<br>- Commence planning for Developmental Test (DT) Assist on EDM 1<br>- Commence planning of Factory Acceptance Test (FAT) on EDMs 2 through 4<br>- Continue to support integration planning and testing of AOEW, MH-60R/S, CMS, CDLMS, SKCS, Link-16, and AOP<br>- Support NAVAIR flight certification testing. Flight certification is required by NAVAIR to ensure Safety of Flight and to certify the interoperability between the MH-60R/S and the AOEW decoy<br>- Commence Production Readiness Review (PRR) planning<br>- Complete assembly and commence delivery of AOEW mass models 1 through 7 for NAVAIR testing<br>- Continue to support AOP to update MH-60R/S software necessary for AOEW decoy and Helicopter Integration<br>- Commence planning of Environmental/Electro Magnetic Interference (EMI) Testing<br>- Support battery certification<br>- Complete development and deliver AOEW Technique Generator | | | | | |
| ***FY 2020 Base Plans:***<br>- Continue E&MD<br>- Complete EDM Hardware and Software development and integration<br>- Conduct FQT on EDM 1<br>- Conduct DT Assist on EDM 1<br>- Conduct FAT on EDMs 2 through 4<br>- Continue to support integration planning and testing of AOEW, MH-60R/S, CMS, CDLMS, SKCS, Link-16, and AOP<br>- Complete delivery of AOEW EDMs 1 through 4 | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Procure material for EDMs 5 and 6<br>- Commence assembly of EDMs 5 and 6<br>- Continue to support NAVAIR flight certification testing. Flight certification is required by NAVAIR to ensure Safety of Flight and to certify the interoperability between the MH-60R/S and AOEW decoy<br>- Complete planning and conduct PRR<br>- Continue to support AOP to update MH-60R and MH-60S software necessary for AOEW decoy and Helicopter integration<br>- Conduct Environmental/EMI Testing<br>- Continue to support battery certification<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in funding from FY 2019 to FY 2020 is primarily due to procurement of fewer EDMs. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 39.836 | 64.694 | 54.279 | 0.000 | 54.279 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/5530: *Anti-ship Missile Decoy System* | 0.000 | 0.000 | 0.000 | - | 0.000 | 6.071 | 25.806 | 25.397 | 25.818 | 0.000 | 83.092 |

**Remarks**

OPN Controls reflect the following Line Item 5530 Project Unit (PU) under the 'ANTI-SHIP MISSILE DECOY SYSTEM' program: VV500.

**D. Acquisition Strategy**

The AOEW DDE decoy is being competitively contracted and developed, and builds on technologies and concepts currently in development by ONR.

**E. Performance Metrics**

Achieve Milestone (MS) C
Conduct Initial Operational Test and Evaluation (IOT&E)
Conduct Developmental Test (DT) Assist
Conduct DDE Test and Certification
Conduct Full Rate Production (FRP)/Decision Review (DR)

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

Conduct MH-60R/S Flight Certification
Define Autonomous Flight Vehicle Requirements
Conduct Follow-on Operational Test and Evaluation (FOT&E)

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3316 / *Advanced Offboard EW* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concept Analysis and Integration Assessment | SS/CPFF | APL : Laurel, MD | 11.707 | 0.000 | | 0.000 | | 1.667 | Nov 2019 | - | | 1.667 | Continuing | Continuing | Continuing |
| Concept Analysis and Technology Studies | WR | MIT-LL : Boston, MA | 4.857 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Concept Development and Technology Studies | WR | NRL : Washington, D.C. | 25.856 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Technology Development and Systems Requirements | WR | NSWC Dahlgren : Dahlgren, VA | 13.974 | 0.621 | Nov 2017 | 0.000 | | 4.333 | Nov 2019 | - | | 4.333 | Continuing | Continuing | Continuing |
| DDE Avionics Development | WR | NAVAIR : Patuxent River, MD | 3.193 | 1.996 | Nov 2017 | 5.565 | Dec 2018 | 6.893 | Nov 2019 | - | | 6.893 | Continuing | Continuing | Continuing |
| DDE Preliminary Design/ E&MD | C/CPIF | Lockheed Martin : Syracuse, NY | 9.013 | 23.335 | Nov 2017 | 39.185 | Oct 2018 | 13.312 | Nov 2019 | - | | 13.312 | Continuing | Continuing | Continuing |
| Ship Integration | WR | SPAWAR : San Diego, CA | 0.952 | 0.023 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.975 | - |
| Ship Integration | WR | NSWC Dahlgren : Dahlgren, VA | 0.000 | 0.000 | | 0.534 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.534 | - |
| | | **Subtotal** | 69.552 | 25.975 | | 45.284 | | 26.205 | | - | | 26.205 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Development Support | WR | NRL : Washington, DC | 9.209 | 3.944 | Nov 2017 | 5.334 | Dec 2018 | 3.748 | Nov 2019 | - | | 3.748 | Continuing | Continuing | Continuing |
| Government Development and Engineering Support | WR | NSWC Dahlgren : Dahlgren, VA | 9.110 | 2.409 | Nov 2017 | 2.090 | Dec 2018 | 2.509 | Nov 2019 | - | | 2.509 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NSWC Crane : Crane, IN | 11.395 | 1.958 | Nov 2017 | 3.254 | Nov 2018 | 1.919 | Nov 2019 | - | | 1.919 | Continuing | Continuing | Continuing |
| Logistics/Training | SS/CPFF | EWA : Fairmont, WV | 0.767 | 0.099 | Aug 2018 | 0.730 | Jan 2019 | 0.100 | Nov 2019 | - | | 0.100 | 0.000 | 1.696 | - |
| Government Engineering Support | WR | NSWC Carderock : Bethesda, MD | 0.768 | 0.000 | | 0.440 | Jan 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering Support | SS/CPFF | APL : Laurel, MD | 3.743 | 2.079 | Nov 2017 | 2.158 | Jan 2019 | 1.646 | Nov 2019 | - | | 1.646 | Continuing | Continuing | Continuing |
| Government Development Support | WR | NAVAIR : Patuxent River, MD | 3.353 | 1.317 | Nov 2017 | 1.300 | Dec 2018 | 1.889 | Nov 2019 | - | | 1.889 | Continuing | Continuing | Continuing |
| Systems Engineering Support | WR | MIT-LL : Boston, MA | 0.000 | 0.034 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.034 | - |
| Program Management Support | WR | DISA : Pensacola, FL | 0.055 | 0.140 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.195 | - |
| Installation Support | WR | Supship : Bath, ME | 0.000 | 0.005 | Jan 2019 | 0.153 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.158 | - |
| | | **Subtotal** | 38.400 | 11.985 | | 15.459 | | 11.811 | | - | | 11.811 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test Planning and Development Testing | WR | NRL : Washington, DC | 4.148 | 0.239 | Nov 2017 | 0.250 | Dec 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test Planning and Development Testing | WR | NSWC/Dahlgren : Dahlgren, VA | 3.213 | 0.000 | | 0.000 | | 5.876 | Nov 2019 | - | | 5.876 | Continuing | Continuing | Continuing |
| Test Planning and Development Testing | WR | NSWC Crane : Crane, IN | 1.239 | 0.147 | Nov 2017 | 0.055 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Test Planning and Development Testing | WR | NAVAIR : Patuxent River, MD | 0.489 | 0.606 | Nov 2017 | 3.309 | Dec 2018 | 7.110 | Nov 2019 | - | | 7.110 | Continuing | Continuing | Continuing |
| Test Planning and Development Testing | WR | OPTEVFOR : Norfolk, VA | 0.599 | 0.075 | Jan 2018 | 0.305 | Dec 2018 | 0.495 | Nov 2019 | - | | 0.495 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 9.688 | 1.067 | | 3.919 | | 13.481 | | - | | 13.481 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3316 / *Advanced Offboard EW* | |

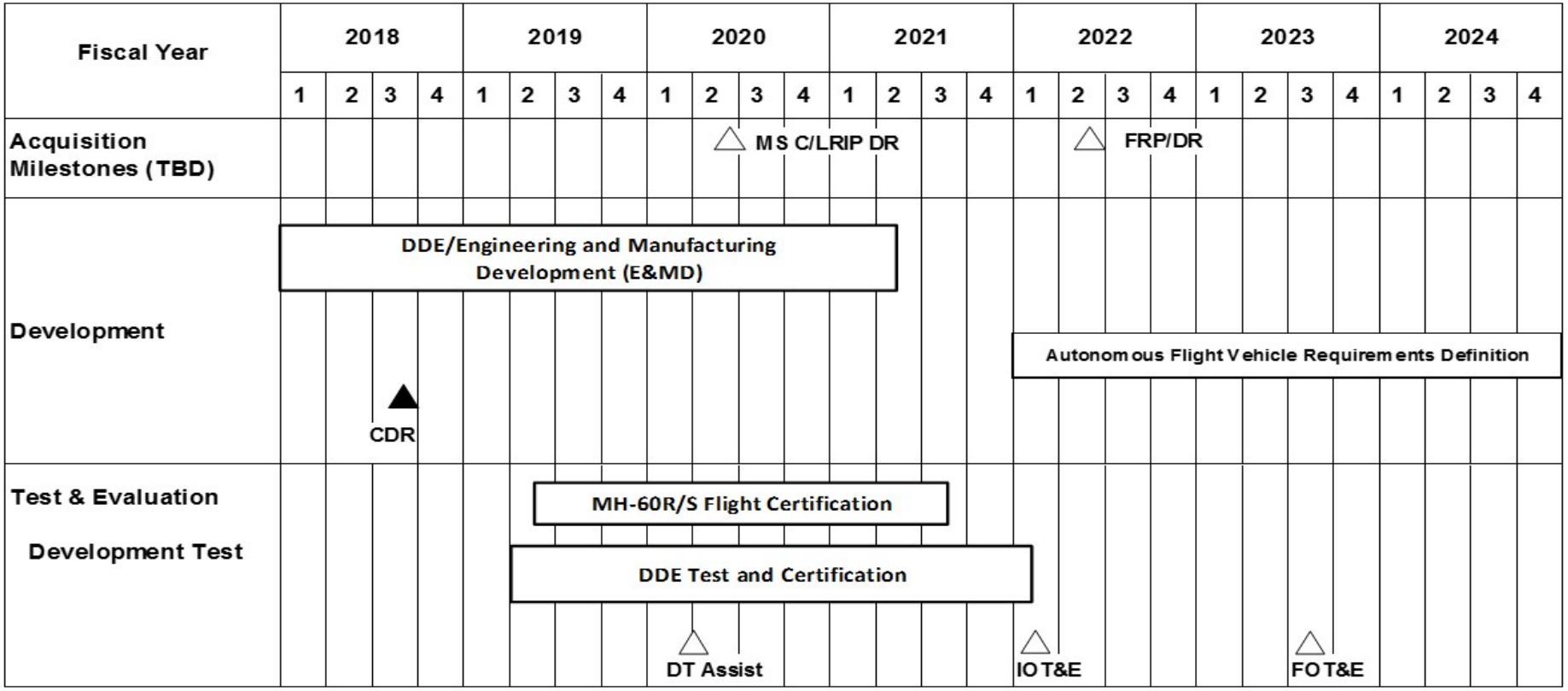
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPIF | CACI (SEAPORT) : Washington, DC | 0.858 | 0.312 | Jan 2018 | 0.000 | | 0.456 | Nov 2019 | - | | 0.456 | 0.000 | 1.626 | - |
| Program Management Support | C/CPIF | SPA : Washington, DC | 0.821 | 0.000 | | 0.000 | | 1.418 | Nov 2019 | - | | 1.418 | 0.000 | 2.239 | - |
| Program Management Support | C/CPIF | TMB (SEAPORT) : Washington, DC | 1.403 | 0.290 | Jan 2018 | 0.000 | | 0.821 | Nov 2019 | - | | 0.821 | 0.000 | 2.514 | - |
| Program Management Support | C/CPIF | STRATEGIC INSIGHT (SEAPORT) : Washington, DC | 0.041 | 0.017 | Jan 2018 | 0.000 | | 0.017 | Nov 2019 | - | | 0.017 | 0.000 | 0.075 | - |
| Program Management Support | WR | NSWC Indian Head : Indian Head, MD | 0.000 | 0.150 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| Travel | WR | NAVSEA Program Office Travel : Washington, DC | 0.159 | 0.040 | Jan 2018 | 0.032 | Dec 2018 | 0.070 | Nov 2019 | - | | 0.070 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.282 | 0.809 | | 0.032 | | 2.782 | | - | | 2.782 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 120.922 | 39.836 | | 64.694 | | 54.279 | | - | | 54.279 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |




Acronyms: MS - Milestone; LRIP - Low Rate Initial Production; DR - Decision Review; FRP - Full Rate Production; DDE - Decoy Development Effort; CDR - Critical Design Review; DT - Developmental Test; IOT&E - Initial Operational Test and Evaluation; FOT&E - Follow-on Operational Test and Evaluation

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3316 / *Advanced Offboard EW* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3316*** | | | | |
| DDE / E&MD | 1 | 2018 | 2 | 2021 |
| Critical Design Review (CDR) | 3 | 2018 | 3 | 2018 |
| DDE Test and Certification | 2 | 2019 | 1 | 2022 |
| MH60-R/S Flight Certification | 2 | 2019 | 3 | 2021 |
| Developmental Test (DT) Assist | 2 | 2020 | 2 | 2020 |
| Milestone (MS) C / LRIP DR | 2 | 2020 | 2 | 2020 |
| Initial Operational Test and Evaluation (IOT&E) | 1 | 2022 | 1 | 2022 |
| Autonomous Flight Vehicle Requirements Definition | 1 | 2022 | 4 | 2024 |
| Full Rate Production (FRP) / Decision Review (DR) | 2 | 2022 | 2 | 2022 |
| Follow-On Operational Test and Evaluation (FOT&E) | 3 | 2023 | 3 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3321 / *SEWIP Block 3* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3321: *SEWIP Block 3* | 250.277 | 76.313 | 35.877 | 22.129 | - | 22.129 | 22.893 | 6.906 | 6.955 | 7.087 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

SEWIP Block 3 is developing an Electronic Attack (EA) capability improvement required for the AN/SLQ-32(V) system to keep pace with the threat. SEWIP Block 3 will provide the AN/SLQ-32(V)7 system for all surface ships (CVN, DDG, LHD) outfitted with the active variant of the AN/SLQ-32, mainly the (V)3 and (V)4, as well as select new construction platforms.

The SEWIP Block 3 Acquisition leverages technology developed under the Office of Naval Research's (ONR) Integrated Topside (InTop) Science and Technology (S&T) effort. SEWIP Block 3 will continue to expand the integrated shipboard combat system by providing a new integrated EA transmitter, array, and associated EA techniques. The AN/SLQ-32(V)7 integrates the new EA countermeasure (SEWIP Block 3) with the AN/SLQ-32(V)6. The AN/SLQ-32(V)6 includes an Electronic Support(ES) receiver (SEWIP Block 2), a High Gain High Sensitivity (HGHS) receiver (SEWIP Block 1B3), a Specific Emitter Identifier (SEI) receiver (SEWIP Block 1B2), display console, and backend electronics. SEWIP Block 3 includes a government software development and integration effort for a SoftKill Coordinator (SKC) to manage EA engagements. SEWIP Block 3 is developing an Electronic Warfare Test Bed (EWTB) to validate system performance.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SEWIP Block 3 Government Engineering | 3.955 | 9.493 | 11.447 | 0.000 | 11.447 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue supporting Engineering Development Model (EDM) hardware and software development and integration.<br>- Continue to support of Formal Qualification Testing (FQT).<br>- Continue Electronic Warfare Test Bed (EWTB) model development and verification/validation of model performance.<br>- Continue integrated topside design activities with DDGs. Resume platform integration studies for large deck installations (CVN/LHDs).<br>- Continue test planning for Initial Operational Test & Evaluation (IOT&E).<br>- Continue planning & development of training curriculum.<br>- Continue to support platform integration activities to ensure compatibility with Aegis Combat Systems. Resume integration studies for SSDS Combat Systems.<br>- Continue to support SKC integration with EA functionality builds. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3321 / *SEWIP Block 3* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Support Production Readiness Review (PRR).<br><br>FY 2019 Government Engineering funding increased due to the planning and support of FQT.<br><br>***FY 2020 Base Plans:***<br>- Complete supporting Engineering Development Model (EDM) hardware and software development and integration; accept EDM.<br>- Complete support of FQT.<br>- Commence support of Land Based test events at Wallops.<br>- Continue EWTB model development and verification/validation of model performance.<br>- Continue integrated topside design activities with DDG, CVN, LHD.<br>- Continue test planning for IOT&E.<br>- Continue planning & development of training curriculum.<br>- Continue to support platform integration activities to ensure compatibility with Aegis and SSDS Combat Systems.<br>- Support System Verification Review/Functional Configuration Audit (SVR/FCA).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>- Increase in FY 2020 is due to the planning and conduct of Government testing of the Engineering Development Model (EDM) at Wallops Land Based Test (LBT) facility. | | | | | |
| ***Title:*** SEWIP Block 3 Development | 72.358 | 26.384 | 10.682 | 0.000 | 10.682 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Continue EDM hardware and software development and integration.<br>- Commence FQT.<br>- Continue support for model and simulation development for EWTB.<br>- Continue integrated topside design activities with DDGs.<br>- Continue platform integration activities to ensure compatibility with Aegis Combat Systems.<br>- Conduct PRR.<br>- Commence Surface Electronic Warfare Team Trainer (SEWTT) EA functionality development for AN/SLQ-32(V). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3321 / *SEWIP Block 3* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Decrease in FY 2019 since PB 2019 is due to ramp down of E&MD activities towards completion in Q2 FY 2020.<br>***FY 2020 Base Plans:***<br>- Complete EDM hardware and software development and integration.<br>- Complete FQT<br>- Commence support Land Based test events at Wallops.<br>- Continue support for model and simulation development for EWTB.<br>- Complete integrated topside design activities with DDGs.<br>- Complete platform integration activities to ensure compatibility with Aegis Combat Systems.<br>- Complete Surface Electronic Warfare Team Trainer (SEWTT) EA functionality development for AN/SLQ-32(V).<br>- Conduct SVR/FCA.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>- Decrease in FY 2020 is due to the completion of E&MD. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 76.313 | 35.877 | 22.129 | 0.000 | 22.129 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2312: *AN/SLQ-32* | 233.237 | 366.147 | 420.154 | - | 420.154 | 546.922 | 415.784 | 399.808 | 347.341 | 2,359.812 | 6,108.679 |

**Remarks**

**D. Acquisition Strategy**

SEWIP will develop block upgrades to SLQ-32 based on integrating technology advances and adding functional capabilities in an incremental fashion. Each block and sub-block will be developed and contracted in an individual yet coordinated and overlapping fashion. Specifically, SEWIP Block 3 involves the transitioning and leveraging of work performed under the Integrated Topside (INTOP) program sponsored by ONR, which focused on designing/architecting an integrated Electronic Attack (EA), Information Operations (IO), and Line of Site (LOS) Comms system for Naval Surface Platforms.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3321 / *SEWIP Block 3* |

**E. Performance Metrics**

Complete Engineering & Manufacturing Development (E&MD).
Complete DT Assist.
Complete Production Readiness Review (PRR).
Achieve Block 3 MS C / Low Rate Initial Production (LRIP) Decision Review (DR).
Complete Formal Qualification Test (FQT).
Complete TECHEVAL.
Complete Initial Operational Test & Evaluation (IOT&E).
Achieve Block 3 Full Rate Production (FRP) DR.
Complete Follow-on Operational Test & Evaluation (FOT&E).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3321 / *SEWIP Block 3* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 3 SEWTT Development | SS/CPFF | EWA-GSI : Fairmont, WV | 1.619 | 0.000 | | 0.000 | Dec 2018 | 0.100 | Dec 2019 | - | | 0.100 | Continuing | Continuing | Continuing |
| Block 3 Preliminary Design/E&MD | C/CPIF | Northrop Grumman : Baltimore, MD | 138.539 | 72.358 | Oct 2017 | 26.384 | Oct 2018 | 10.582 | Oct 2019 | - | | 10.582 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 140.158 | 72.358 | | 26.384 | | 10.682 | | - | | 10.682 | Continuing | Continuing | N/A |

**Remarks**

FY18 system development increase due to antenna design complexity and higher volume and cost of materials than originally planned.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 3 Integrated Logistics Support | WR | NSWC Crane : Crane, IN | 9.552 | 0.146 | Nov 2017 | 0.200 | Nov 2018 | 0.419 | Nov 2019 | - | | 0.419 | Continuing | Continuing | Continuing |
| Block 3 Integrated Logistics Support | WR | NSWC Corona : Corona, CA | 0.000 | 0.023 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.023 | - |
| Block 3 Government Engineering Support | WR | NSWC Dahlgren : Dahlgren, VA | 22.082 | 0.371 | Nov 2017 | 0.400 | Nov 2018 | 0.468 | Nov 2019 | - | | 0.468 | Continuing | Continuing | Continuing |
| Block 3 Government Engineering Support | WR | NSWC Crane : Crane, IN | 7.982 | 0.347 | Nov 2017 | 0.586 | Nov 2018 | 0.300 | Nov 2019 | - | | 0.300 | Continuing | Continuing | Continuing |
| Block 3 Government Engineering Support | WR | NRL : Washington, DC | 19.877 | 1.361 | Nov 2017 | 1.500 | Dec 2018 | 1.526 | Nov 2019 | - | | 1.526 | Continuing | Continuing | Continuing |
| Block 3 Government Engineering Support | SS/CPFF | APL : Laurel, MD | 23.958 | 0.582 | Mar 2018 | 1.196 | Dec 2018 | 0.650 | Nov 2019 | - | | 0.650 | Continuing | Continuing | Continuing |
| Block 3 Government Engineering Support | WR | MIT-LL : Cambridge, MA | 4.794 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Block 3 Feasibility Studies | WR | BIW : Bath, ME | 0.510 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.510 | - |
| Block 3 Platform Integration Studies | WR | Norfolk Naval Shipyard (NNSY) : Norfolk, VA | 0.040 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.040 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3321 / *SEWIP Block 3* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 3 Platform Integration Studies | WR | SUPSHIP Gulf Coast : Pascagoula, MS | 0.062 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.062 | - |
| Block 3 Platform Integration Studies | WR | NSWC Philadelphia : Philadelphia, PA | 0.139 | 0.073 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.212 | - |
| Block 3 Platform Integration Studies | WR | NAVSEA 05 (Alion) : Washington, DC | 0.297 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.297 | - |
| Block 3 Platform Integration Studies | WR | NAVSEA 05 (CSRA) : Washington, DC | 0.149 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.149 | - |
| Block 3 Platform Integration Studies | WR | Lockheed Martin : Moorstown, NJ | 0.202 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.202 | - |
| | | **Subtotal** | 89.644 | 2.903 | | 3.882 | | 3.363 | | - | | 3.363 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 3 Test Planning/T&E Events | WR | NSWC Dahlgren : Dahlgren, VA | 4.194 | 0.135 | Nov 2017 | 0.300 | Nov 2018 | 2.250 | Nov 2019 | - | | 2.250 | Continuing | Continuing | Continuing |
| Block 3 Test Planning/T&E Events | WR | NSWC Crane : Crane, IN | 2.591 | 0.012 | Mar 2018 | 0.348 | Nov 2018 | 1.000 | Nov 2019 | - | | 1.000 | Continuing | Continuing | Continuing |
| Block 3 Test Planning/T&E Events | WR | NRL : Washington, DC | 10.008 | 0.141 | Nov 2017 | 1.122 | Dec 2018 | 2.233 | Nov 2019 | - | | 2.233 | Continuing | Continuing | Continuing |
| Block 3 Test Planning/T&E Events | SS/CPFF | APL : Laurel, MD | 0.749 | 0.023 | Nov 2017 | 0.665 | Jan 2019 | 1.500 | Nov 2019 | - | | 1.500 | Continuing | Continuing | Continuing |
| Block 3 Test Planning/T&E Events | WR | COMOPTEVFOR : Norfolk, VA | 0.176 | 0.091 | Aug 2018 | 0.257 | Dec 2018 | 0.337 | Nov 2019 | - | | 0.337 | Continuing | Continuing | Continuing |
| Block 3 Test Planning/T&E Events | WR | Surface Combat Systems Center : Wallops Island, VA | 0.356 | 0.000 | | 2.186 | Nov 2018 | 0.250 | Nov 2019 | - | | 0.250 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3321 / *SEWIP Block 3* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAVFAC | WR | NAVFAC Mid-Atlantic : Norfolk, VA | 0.167 | 0.523 | Jun 2018 | 0.415 | Nov 2018 | 0.250 | Nov 2019 | - | | 0.250 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 18.241 | 0.925 | | 5.293 | | 7.820 | | - | | 7.820 | Continuing | Continuing | N/A |

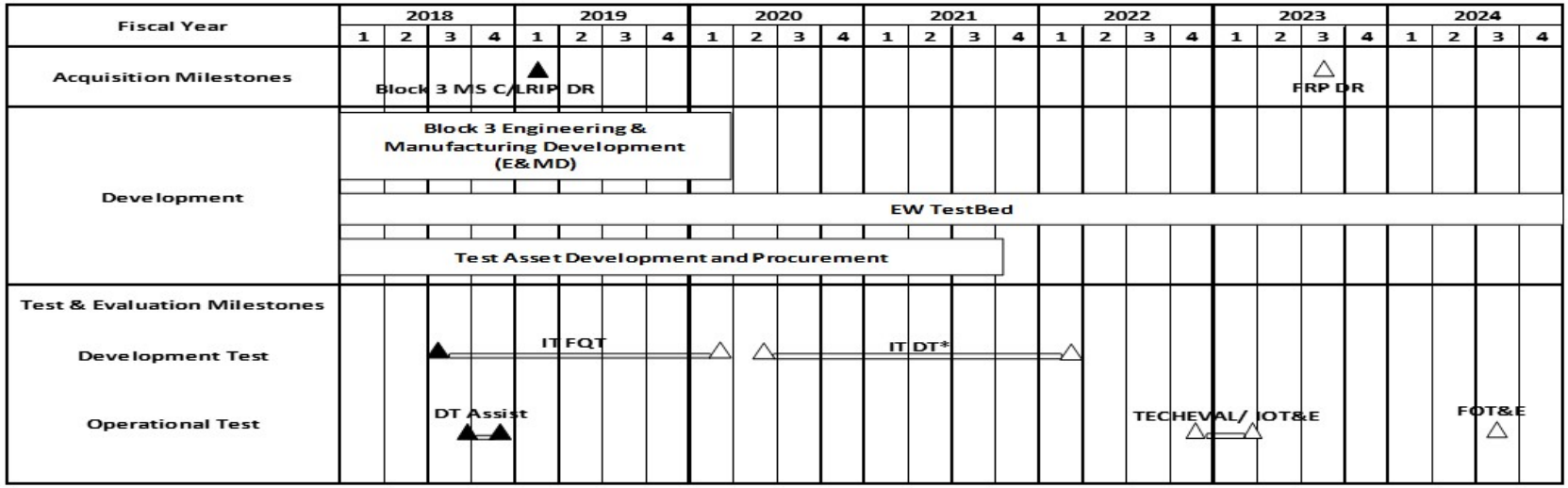
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Block 3 Program Management Support | C/CPIF | TMB (SEAPORT) : Washington, DC | 1.391 | 0.040 | Oct 2018 | 0.086 | Jan 2019 | 0.065 | Nov 2019 | - | | 0.065 | Continuing | Continuing | Continuing |
| Block 3 Program Management Support | C/CPIF | CACI (SEAPORT) : Washington, DC | 0.422 | 0.000 | | 0.127 | Jan 2019 | 0.099 | Nov 2019 | - | | 0.099 | Continuing | Continuing | Continuing |
| Block 3 Program Management Support | C/CPIF | SPA : Washington, DC | 0.074 | 0.072 | Oct 2018 | 0.055 | Dec 2018 | 0.050 | Nov 2019 | - | | 0.050 | Continuing | Continuing | Continuing |
| Block 3 Travel | WR | NAVSEA Program Office : Washington, DC | 0.347 | 0.015 | Mar 2018 | 0.050 | Dec 2018 | 0.050 | Nov 2019 | - | | 0.050 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.234 | 0.127 | | 0.318 | | 0.264 | | - | | 0.264 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 250.277 | 76.313 | | 35.877 | | 22.129 | | - | | 22.129 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3321 / *SEWIP Block 3* |




*** Includes the following test events: Land Test-Block 3 Stand-Alone Operation, Flight Test-Threat Engagements (over water), IA / Maint Demo (Dry Run), CMS Integration (Aegis), DDG-51 Combat System Certification (Aegis Integration), Environment, EMI, RCS, and Shock Tests**

**Acronyms: DR-Decision Review; DT-Developmental Test; EDM - Engineering Development Modle; FOT&E - Follow-on Operational Test & Evaluation; FQT-Formal Qualification Testing; FRP-Full Rate Production; IOT&E-Initial Operational Test & Evaluation; IT-Integrated Testing; LRIP-Low Rate Initial Production; MS-Milestone;**

**Note 1: E&MD and associated IT-FQT extended from Q2FY2019 to Q1FY2020 due to late Engineering Development Model (EDM) delivery caused by additional system design (e.g., antenna, cooling, power) and late EDM material receipt from suppliers delaying manufacturing and integration.**

**Note 2: TECHEVAL / IOT&E moved from Q1FY2021 to Q4FY2022 due to a change in test ships caused by the late delivery of the LRIP #1 system. The production lead time increased from 18 months to 24 months due to longer than previously projected material procurement and processing times for long lead solid state devices in the system. Due to the limited number of ship availabilities long enough to support the SEWIP Block 3 installation duration, the delay in LRIP #1 delivery has a greater impact.**

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | **Project (Number/Name)**<br>3321 / *SEWIP Block 3* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3321.L24*** | | | | |
| Block 3 Engineering and Manufacturing Development (E&MD) | 1 | 2018 | 1 | 2020 |
| EW Testbed | 1 | 2018 | 4 | 2024 |
| Test Asset Development and Procurement | 1 | 2018 | 4 | 2021 |
| IT-FQT | 3 | 2018 | 1 | 2020 |
| DT Assist | 3 | 2018 | 4 | 2018 |
| Block 3 MS C/LRIP DR | 1 | 2019 | 1 | 2019 |
| IT-DT | 2 | 2020 | 1 | 2022 |
| Block 3 TECHEVAL and IOT&E | 4 | 2022 | 1 | 2023 |
| Block 3 FRP DR | 3 | 2023 | 3 | 2023 |
| Block 3 FOT&E | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604757N / *Ship Self Def (Engage: Soft Kill/EW)* | Project (Number/Name)<br>3430 / *SEWIP Block 4* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3430: *SEWIP Block 4* | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 41.600 | 40.100 | 30.000 | 19.300 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

3430 - SEWIP Block 4 will provide EO/IR, ES and EA capability required for US Navy ships to keep pace with the threat. SEWIP Block 4 will provide a common EO/IR surveillance and countermeasure capability to all surface combatants and non-combatants outfitted with SEWIP variants AN/SLQ-32(V)6 and (V)7 as well as select new construction platforms.

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604761N *I Intelligence Engineering* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 11.082 | 44.855 | 25.965 | 26.710 | - | 26.710 | 28.917 | 29.269 | 29.334 | 29.919 | Continuing | Continuing |
| 3103: *Intelligence Engineering* | 11.082 | 6.355 | 3.626 | 3.969 | - | 3.969 | 4.440 | 4.599 | 4.595 | 4.687 | Continuing | Continuing |
| 3419: *Technical Algorithm Development* | 0.000 | 19.400 | 15.698 | 17.016 | - | 17.016 | 18.745 | 18.928 | 18.881 | 19.257 | Continuing | Continuing |
| 3421: *Non-Kinetic Countermeasure Support* | 0.000 | 9.100 | 6.641 | 5.725 | - | 5.725 | 5.732 | 5.742 | 5.858 | 5.975 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 10.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.000 |

**A. Mission Description and Budget Item Justification**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 34.855 | 29.715 | 27.980 | - | 27.980 |
| Current President's Budget | 44.855 | 25.965 | 26.710 | - | 26.710 |
| Total Adjustments | 10.000 | -3.750 | -1.270 | - | -1.270 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -3.750 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | -1.273 | - | -1.273 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.003 | - | 0.003 |
| • Congressional Add Adjustments | 10.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Maritime Port Security Technology Integration* | 10.000 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 10.000 | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604761N *I Intelligence Engineering* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| Congressional Add Totals for all Projects | 10.000 | 0.000 |

**Change Summary Explanation**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>3103 / *Intelligence Engineering* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3103: *Intelligence Engineering* | 11.082 | 6.355 | 3.626 | 3.969 | - | 3.969 | 4.440 | 4.599 | 4.595 | 4.687 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Intelligence Engineering | 6.355 | 3.626 | 3.969 | 0.000 | 3.969 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The details of this program element and decrease impact are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.355 | 3.626 | 3.969 | 0.000 | 3.969 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

**E. Performance Metrics**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>3103 / *Intelligence Engineering* | |

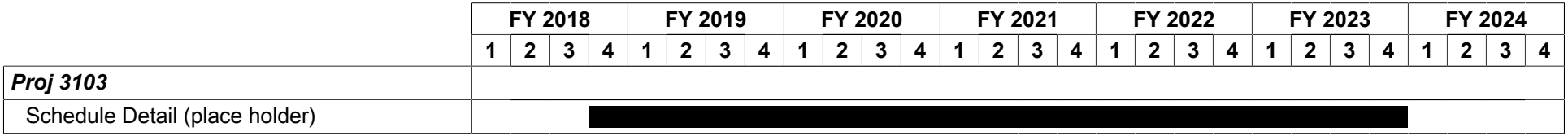
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified | TBD | Not Specified : Not Specified | 11.082 | 6.355 | Mar 2018 | 3.626 | Mar 2019 | 3.969 | Mar 2020 | - | | 3.969 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 11.082 | 6.355 | | 3.626 | | 3.969 | | - | | 3.969 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 11.082 | 6.355 | | 3.626 | | 3.969 | | - | | 3.969 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>3103 / *Intelligence Engineering* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>3103 / *Intelligence Engineering* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3103*** | | | | |
| Schedule Detail (place holder) | 4 | 2018 | 4 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>3419 / *Technical Algorithm Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3419: *Technical Algorithm Development* | 0.000 | 19.400 | 15.698 | 17.016 | - | 17.016 | 18.745 | 18.928 | 18.881 | 19.257 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Technical Algorithm Development | 19.400 | 15.698 | 17.016 | 0.000 | 17.016 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 Base Plans:***<br>The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Classified program | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 19.400 | 15.698 | 17.016 | 0.000 | 17.016 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

**E. Performance Metrics**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>3419 / *Technical Algorithm Development* | |

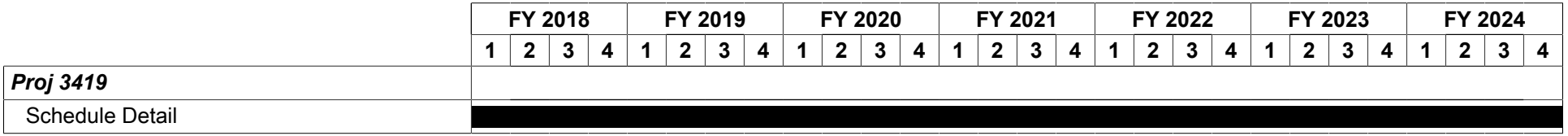
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified Project | TBD | Not Specified : Not Specified | 0.000 | 19.400 | Dec 2017 | 15.698 | Dec 2018 | 17.016 | Dec 2019 | - | | 17.016 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 19.400 | | 15.698 | | 17.016 | | - | | 17.016 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 19.400 | | 15.698 | | 17.016 | | - | | 17.016 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>3419 / *Technical Algorithm Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>3419 / *Technical Algorithm Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3419*** | | | | |
| Schedule Detail | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | | | | Project (Number/Name)<br>3421 / *Non-Kinetic Countermeasure Support* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3421: *Non-Kinetic Countermeasure Support* | 0.000 | 9.100 | 6.641 | 5.725 | - | 5.725 | 5.732 | 5.742 | 5.858 | 5.975 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** New Accomplishment/Planned Program Entry | 9.100 | 6.641 | 5.725 | 0.000 | 5.725 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The details of this program element and decrease impact are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books. | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Planned decrease by CAPE of $2M, additional OSD & DoN PIEE decreases applied. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.100 | 6.641 | 5.725 | 0.000 | 5.725 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

**E. Performance Metrics**

The details of this program element are classified SECRET//NOFORN and are submitted annually to Congress in the classified budget justification books.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>3421 / *Non-Kinetic Countermeasure Support* | |

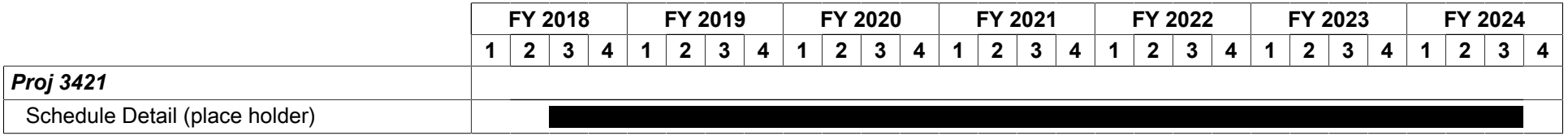
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Classified Project | TBD | Not Specified : Not Specified | 0.000 | 9.100 | Oct 2017 | 6.641 | Oct 2018 | 5.725 | Oct 2019 | - | | 5.725 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 9.100 | | 6.641 | | 5.725 | | - | | 5.725 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 9.100 | | 6.641 | | 5.725 | | - | | 5.725 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>3421 / *Non-Kinetic Countermeasure Support* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>3421 / *Non-Kinetic Countermeasure Support* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3421*** | | | | |
| Schedule Detail (place holder) | 3 | 2018 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 10.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

One year Congressional Add. Consolidates AMRS and Sea Vision into unclassified SeaLink Advances Analysis.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Maritime Port Security Technology Integration | 10.000 | 0.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 10.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604761N / *Intelligence Engineering* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

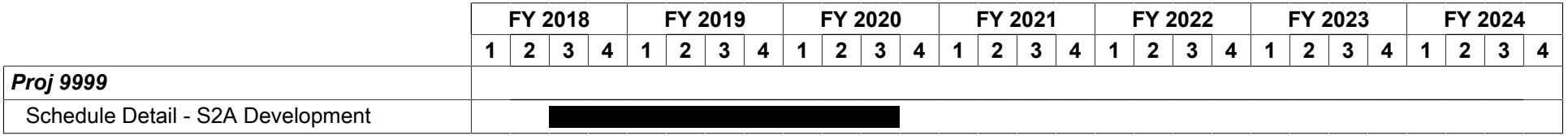
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S2A Development | C/CPFF | Not Specified : Not Specified | 0.000 | 10.000 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | - |
| | | **Subtotal** | 0.000 | 10.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 10.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604761N / *Intelligence Engineering* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Schedule Detail - S2A Development | 3 | 2018 | 3 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604771N *I Medical Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 150.929 | 36.392 | 38.095 | 8.181 | - | 8.181 | 9.020 | 9.249 | 9.478 | 9.668 | Continuing | Continuing |
| 0933: *Medical/Dental Equipment Dev* | 18.628 | 9.353 | 8.095 | 8.181 | - | 8.181 | 9.020 | 9.249 | 9.478 | 9.668 | Continuing | Continuing |
| 9999: *Congressional Adds* | 132.301 | 27.039 | 30.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 189.340 |

**A. Mission Description and Budget Item Justification**

The purpose of this program is to develop biomedical equipment and related techniques to reduce morbidity; to enhance the logistic feasibility of modern medical care for combat casualties; to sustain casualties for evacuation to fixed medical facilities for definitive care; and to ensure that personnel are medically qualified for military duty. Each work unit undertaken in this project has a military requirement. Efforts are justified based upon military payoff and cost benefit. There is a strong potential for dual use, technology transfer, and biotechnology firm/industry participation in the projects.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 9.353 | 8.095 | 8.214 | - | 8.214 |
| Current President's Budget | 36.392 | 38.095 | 8.181 | - | 8.181 |
| Total Adjustments | 27.039 | 30.000 | -0.033 | - | -0.033 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 30.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.961 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.033 | - | -0.033 |
| • Congressional Add Adjustments | 28.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Military Dental Research* | 9.657 | 10.000 |
| Congressional Add: *Hypoxia Research* | 4.828 | 0.000 |
| Congressional Add: *Aircrew Mounted Physiological Sensors* | 2.897 | 0.000 |
| Congressional Add: *Wound Care Research* | 9.657 | 15.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604771N *I Medical Development* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| Congressional Add: *Hypoxia Research (MD)* | 0.000 | 5.000 |
| Congressional Add Subtotals for Project: 9999 | 27.039 | 30.000 |
| Congressional Add Totals for all Projects | 27.039 | 30.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604771N / *Medical Development* | Project (Number/Name)<br>0933 / *Medical/Dental Equipment Dev* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0933: *Medical/Dental Equipment Dev* | 18.628 | 9.353 | 8.095 | 8.181 | - | 8.181 | 9.020 | 9.249 | 9.478 | 9.668 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The purpose of this program is to develop biomedical equipment and related techniques to reduce morbidity; to enhance the logistic feasibility of modern medical care for combat casualties; to sustain casualties for evacuation to fixed medical facilities for definitive care; and to ensure that personnel are medically qualified for military duty. Each work unit undertaken in this project has a military requirement. Efforts are justified based upon military payoff and cost benefit. There is a strong potential for dual use, technology transfer, and biotechnology firms/industry participation in the projects.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Medical/Dental Equipment Development | 9.353 | 8.095 | 8.181 | 0.000 | 8.181 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>-Complete system development and validation of manufacturing support for military relevant Malaria vaccine regimen production scale up.<br>-Continue Individual Fatigue-Based Scheduling and Countermeasure System that predicts, prevents, detects, and mitigates periods of high risk associated with fatigue.<br>-Continue fatigue mitigation and validation of scheduling tools to include validation of an alternative watchstanding schedule on Naval Surface Combatants.<br>-Complete development of future capability products and technologies for management of moderate to severe hemorrhage.<br>-Continue joint development projects with MARCORSYSCOM acquisition for medical products and equipment.<br>-Complete support for phage therapy to combat antibiotic resistant bacterial infections.<br>-Complete support for mitigating adverse physiological episodes to enhance safety and warfighter readiness in tactical aircraft.<br>-Complete Human Performance/Crew Endurance effort: Enhancing Decision-Making under Stress.<br>-Continue Human Performance/Crew Endurance effort: Controlled Light Exposure and Fatigue Mitigation.<br>-Initiate innovative medical technologies; enhanced medical logistics. Primary focus includes enhancing: 1) Casualty treatment capabilities while reducing the overall logistics burden; 2) Medical logistics capability; and 3) Enroute care, patient transport and trauma care systems associated with the time distance continuum in a sea base environment. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>0933 / *Medical/Dental Equipment Dev* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| -Continue innovative medical technologies and enhanced medical logistics: Autonomous system for field delivery of critical medical supplies.<br>-Continue cabin-pressure/decompression sickness (DCS) test and evaluation capability.<br>-Continue clinical trial evaluation of rapid pharmaceutical intervention for the prevention of motion sickness in dynamic military environments.<br>-Initiate evaluation of physiological monitoring sensor system in relevant military environments.<br>-Initiate Human Performance/Crew Endurance effort: Navy specific Stress Inoculation Study.<br>-Initiate medical wargaming to evaluate Distributed Maritime Operations (DMO) and support of Future Fleet Architecture. | | | | | |
| ***FY 2020 Base Plans:***<br>-Complete Individual Fatigue-Based Scheduling and Countermeasure System that predicts, prevents, detects, and mitigates periods of high risk associated with fatigue.<br>-Continue fatigue mitigation and validation of scheduling tools to include validation of an alternative watchstanding schedule on Naval Surface Combatants.<br>-Continue joint development projects with MARCORSYSCOM acquisition for medical products and equipment.<br>-Continue Human Performance/Crew Endurance effort: Controlled Light Exposure and Fatigue Mitigation.<br>-Continue innovative medical technologies; enhanced medical logistics. Primary focus includes enhancing: 1) Casualty treatment capabilities while reducing the overall logistics burden; 2) Medical logistics capability; and 3) Enroute care, patient transport and trauma care systems associated with the time distance continuum in a sea base environment.<br>-Continue innovative medical technologies and enhanced medical logistics: Autonomous system for field delivery of critical medical supplies.<br>-Continue cabin-pressure/decompression sickness (DCS) test and evaluation capability.<br>-Complete clinical trial evaluation of rapid pharmaceutical intervention for the prevention of motion sickness in dynamic military environments.<br>-Continue evaluation of physiological monitoring sensor system in relevant military environments.<br>-Continue Human Performance/Crew Endurance effort: Navy specific Stress Inoculation Study.<br>-Complete medical wargaming to evaluate Distributed Maritime Operations (DMO) and support of Future Fleet Architecture. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>0933 / *Medical/Dental Equipment Dev* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| There is no significant change from FY 2019 to FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.353 | 8.095 | 8.181 | 0.000 | 8.181 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy for product lines and products in the Medical Development Program is designed and implemented consistent with the purpose of the particular product and with the nature and size of the investment. The Medical Development Program has a Memorandum of Agreement with the Marine Corps Systems Command (Family of Field Medical Equipment) for co-development of products for procurement by the USMC. The acquisition strategy for products involves direct partnership with the acquisition and procurement professionals at Marine Corps Systems Command.

The major Product Areas in the Medical Development Program are: 1) Equipment, 2) Pharmaceuticals/Biologics, and 3) Operational Knowledge/Concepts. The primary Program Areas of Interest are: 1) Optimize health, performance, and resilience of the ready and forward operating forces; 2) Enhance medical logistics; 3) Reduce mortality and morbidity from battlefield and mission-related injuries in support of Navy Health Services Support in Terrestrial, Maritime Surface, Submarine, and Aviation Operations and USMC in Expeditionary Operations.

For Product Areas 1 and 2, there are two primary acquisition strategies. The first is to test and evaluate for Naval application commercially-developed medical product or candidates in managed trials with the ultimate goal of Food and Drug Administration (FDA) approval, where appropriate. Partnerships with commercial developers promotes developing products of military interest for procurement by the Operating Forces. A second benefit of this strategy is that products are made available across the DoD, Federal Government, and commercial market, thus reducing overall procurement costs. During development, DoD end users are included in the process to the extent possible. The second strategy is to drive a collaborative development process with larger DoD program investments. Navy and Marine Corps needs can be met at lower service cost. This process involves developing in-house or industrial prototypes in government-managed programs to meet Naval needs while meeting regulatory requirements for production and fielding. Both tactics promote development of procurement plans that align product availability with Service integration strategies.

The Third Product Area (Knowledge/Concepts) is focused on the introduction of technologies, techniques, and procedures that enhance medical practice and standards of care for effective delivery of health care and casualty care in the Naval operating environment. These primarily require early involvement of the senior leadership of military medicine, in that the end product of the program is modification of concepts of operations, policy, and/or doctrine. These acquisitions can impact the care and performance of Sailors and Marines. Medical Development Program examples include Navy Crew Endurance Handbook and associated implementation tools.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>0933 / *Medical/Dental Equipment Dev* |

**E. Performance Metrics**

Successful completion of Milestones/Demonstration Events for individualized project/product roadmap, on time and on budget. Ensuring dependencies across multiple efforts are maintained on schedule are primary metrics.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604771N / *Medical Development* | Project (Number/Name)<br>0933 / *Medical/Dental Equipment Dev* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Malaria Vaccine | SS/CR | Sanaria, Inc. : Rockville, MD | 7.084 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.084 | - |
| Malaria Vaccine | C/FFP | Various : Not Specified | 0.133 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.133 | - |
| Human Factors Individualized Fatigue Based Scheduling | Allot | Naval Submarine Medical Research Laboratory : Groton, CT | 1.641 | 0.425 | Mar 2018 | 0.429 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.495 | - |
| Fatigue Based Scheduling | WR | Naval Post Graduate School : Monterey, CA | 1.324 | 0.390 | Dec 2017 | 0.303 | Mar 2019 | 0.301 | Dec 2019 | - | | 0.301 | Continuing | Continuing | Continuing |
| Future capabilities products & technologies: Management of Moderate to Severe Hemorrhage | Allot | Naval Med Rsrch. Cntr./Walter Reed Inst. of Rsrch. : Silver Spring, MD | 0.659 | 0.235 | May 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.894 | - |
| Marine Corps Systems Command Medical Products and Equipment | Various | Various : Not Specified | 0.374 | 0.000 | | 0.500 | Jun 2019 | 0.750 | Jun 2020 | - | | 0.750 | Continuing | Continuing | Continuing |
| Phage Therapy | Allot | Naval Med Rsrch. Cntr./Walter Reed Inst. of Rsrch. : Silver Spring, MD | 0.532 | 0.346 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.878 | - |
| Mitigation of Adverse Physiological Episodes in Tactical Aircraft | Allot | Various : Not Specified | 0.272 | 0.995 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.267 | - |
| Enhanced Decision Making Under Stress | Allot | Naval Health Research Center : San Diego, CA | 0.000 | 0.397 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.397 | - |
| Crew Endurance and Fatigue Mitigation | WR | Naval Post Graduate School : Monterey, CA | 0.000 | 1.515 | Mar 2018 | 1.300 | Dec 2018 | 1.510 | Dec 2019 | - | | 1.510 | Continuing | Continuing | Continuing |
| Innovative Medical Technologies and Logistics | Various | Various : Not Specified | 0.000 | 0.000 | | 0.671 | Jun 2019 | 1.329 | May 2020 | - | | 1.329 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604771N / *Medical Development* | Project (Number/Name)<br>0933 / *Medical/Dental Equipment Dev* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Autonomous System for Field Delivery of Critical Medical Supplies | Various | Various : Not Specified | 0.000 | 2.000 | May 2018 | 3.200 | May 2019 | 2.750 | May 2020 | - | | 2.750 | Continuing | Continuing | Continuing |
| Cabin-pressure/ Decompression Sickness Test and Evaluation Capability | C/FFP | TBD : Not Specified | 0.000 | 1.500 | Dec 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Rapid Pharmaceutical Intervention for the Prevention of Motion Sickness | Allot | Naval Medical Research Unit - Dayton : Dayton, OH | 0.000 | 0.328 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.328 | - |
| Physiological Monitoring Sensor Systems | Various | Various : Not Specified | 0.000 | 0.000 | | 0.550 | Jul 2019 | 0.500 | May 2020 | - | | 0.500 | Continuing | Continuing | Continuing |
| Medical wargaming to evaluate Distrbuted Maritime Operations (DMO) | TBD | Center for Naval Analysis : Arlington, VA | 0.000 | 0.250 | Jan 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| Medical wargaming to evaluate and support Future Fleet Architecture | TBD | Center for Naval Analysis : Arlington, VA | 0.000 | 0.750 | Feb 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |
| Navy specific Stress Inoculation Study | WR | Naval Post Graduate School : Monterey, CA | 0.000 | 0.000 | | 0.300 | Mar 2019 | 0.299 | Dec 2019 | - | | 0.299 | Continuing | Continuing | Continuing |
| Medical Product Development | Various | Various : Not Specified | 5.586 | 0.000 | | 0.097 | Aug 2019 | 0.022 | Aug 2020 | - | | 0.022 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 17.605 | 9.131 | | 7.350 | | 7.461 | | - | | 7.461 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

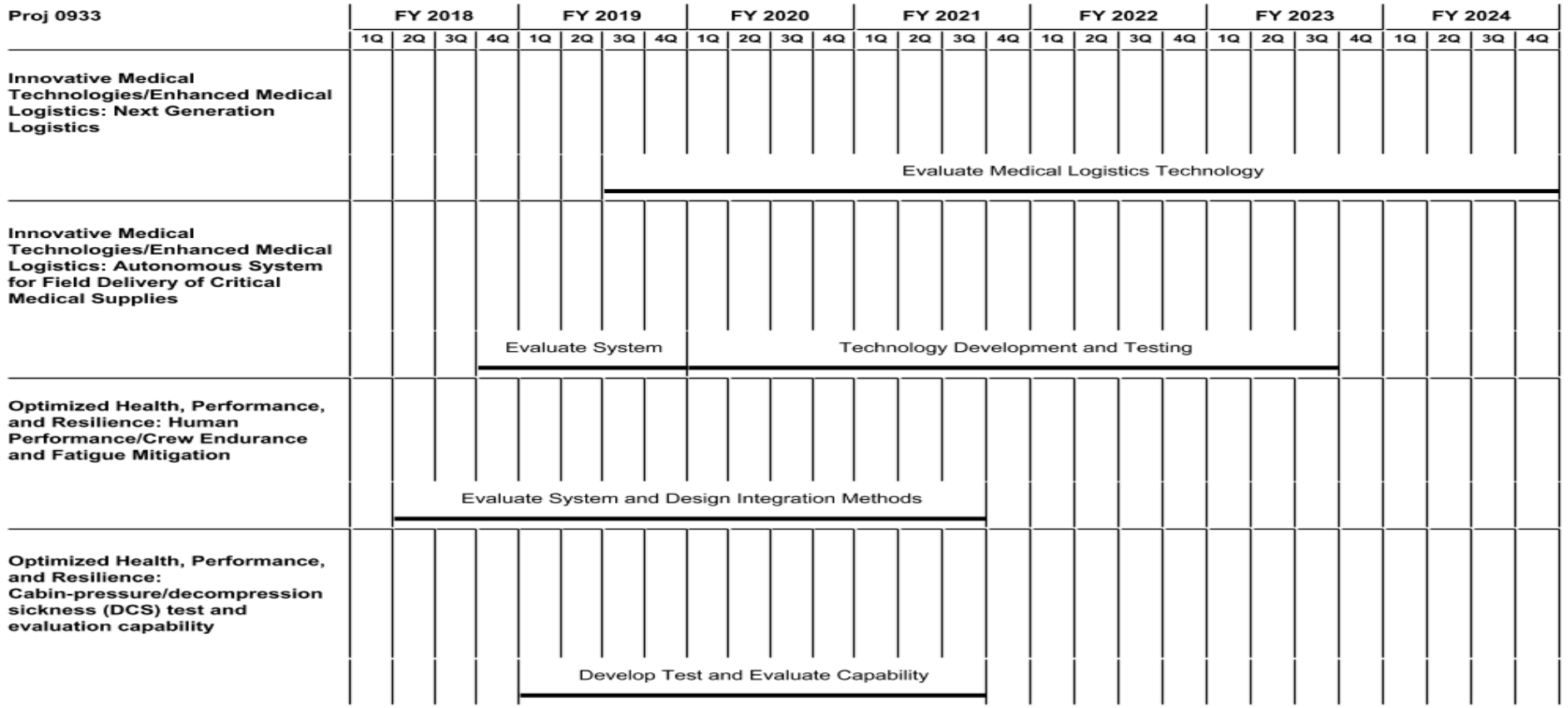
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Support | Various | Various : Not Specified | 1.023 | 0.222 | Aug 2018 | 0.745 | Aug 2019 | 0.720 | Aug 2020 | - | | 0.720 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.023 | 0.222 | | 0.745 | | 0.720 | | - | | 0.720 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604771N / *Medical Development* | Project (Number/Name)<br>0933 / *Medical/Dental Equipment Dev* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 18.628 | 9.353 | | 8.095 | | 8.181 | | - | | 8.181 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>0933 / *Medical/Dental Equipment Dev* |




*2020PB - 0604771N - 0933*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>0933 / *Medical/Dental Equipment Dev* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0933*** | | | | |
| Innovative Medical Technologies/Enhanced Medical Logistics: Next Generation Logistics: Evaluate Medical Logistics Technology | 3 | 2019 | 4 | 2024 |
| Innovative Medical Technologies/Enhanced Medical Logistics: Autonomous System for Field Delivery of Critical Medical Supplies: Evaluate System | 4 | 2018 | 4 | 2019 |
| Innovative Medical Technologies/Enhanced Medical Logistics: Autonomous System for Field Delivery of Critical Medical Supplies: Technology Development and Testing | 1 | 2020 | 3 | 2023 |
| Optimized Health, Performance, and Resilience: Human Performance/Crew Endurance and Fatigue Mitigation: Evaluate System and Design Integration Methods | 2 | 2018 | 3 | 2021 |
| Optimized Health, Performance, and Resilience: Cabin-pressure/decompression sickness (DCS) test and evaluation capability: Develop Test and Evaluate Capability | 1 | 2019 | 3 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604771N / *Medical Development* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 132.301 | 27.039 | 30.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 189.340 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

None

**A. Mission Description and Budget Item Justification**

Congressional Adds

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Military Dental Research<br>***FY 2018 Accomplishments:*** Continue efforts in craniofacial injury surveillance; combat dentistry; treatment of maxillofacial injury; dental disease non-battle injuries; and oral/facial disease and infection in military personnel.<br>***FY 2019 Plans:*** Continue efforts in craniofacial injury surveillance; combat dentistry; treatment of maxillofacial injury; dental disease non-battle injuries; and oral/facial disease and infection in military personnel. | 9.657 | 10.000 |
| ***Congressional Add:*** Hypoxia Research<br>***FY 2018 Accomplishments:*** Initiate research to help inform Doctrine Organization Training Material Leadership Personnel Facilities (DOTMLPF) updates to meet pilot mission needs and to ensure the safety of service members. Focus areas to include: Cabin pressure related events/decompression sickness (DCS); Toxicology of chemical exposure; and Physiological monitoring.<br>***FY 2019 Plans:*** N/A | 4.828 | 0.000 |
| ***Congressional Add:*** Aircrew Mounted Physiological Sensors<br>***FY 2018 Accomplishments:*** Initiate research for physiological monitoring of aircrew physiological events.<br>***FY 2019 Plans:*** N/A | 2.897 | 0.000 |
| ***Congressional Add:*** Wound Care Research | 9.657 | 15.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***FY 2018 Accomplishments:*** Continue to develop novel diagnostics and treatments to enhance the care of the wounded warfighter.<br>***FY 2019 Plans:*** Continue to develop novel diagnostics and treatments to enhance the care of the wounded warfighter. | | |
| ***Congressional Add:*** Hypoxia Research (MD)<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Initiate research to help inform Doctrine Organization Training Material Leadership Personnel Facilities (DOTMLPF) updates to meet pilot mission needs and to ensure the safety of service members. Focus areas to include: Cabin pressure related events/decompression sickness (DCS); Toxicology of chemical exposure; and Physiological monitoring. | 0.000 | 5.000 |
| **Congressional Adds Subtotals** | 27.039 | 30.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

None

**E. Performance Metrics**

Not required for Congressional adds.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

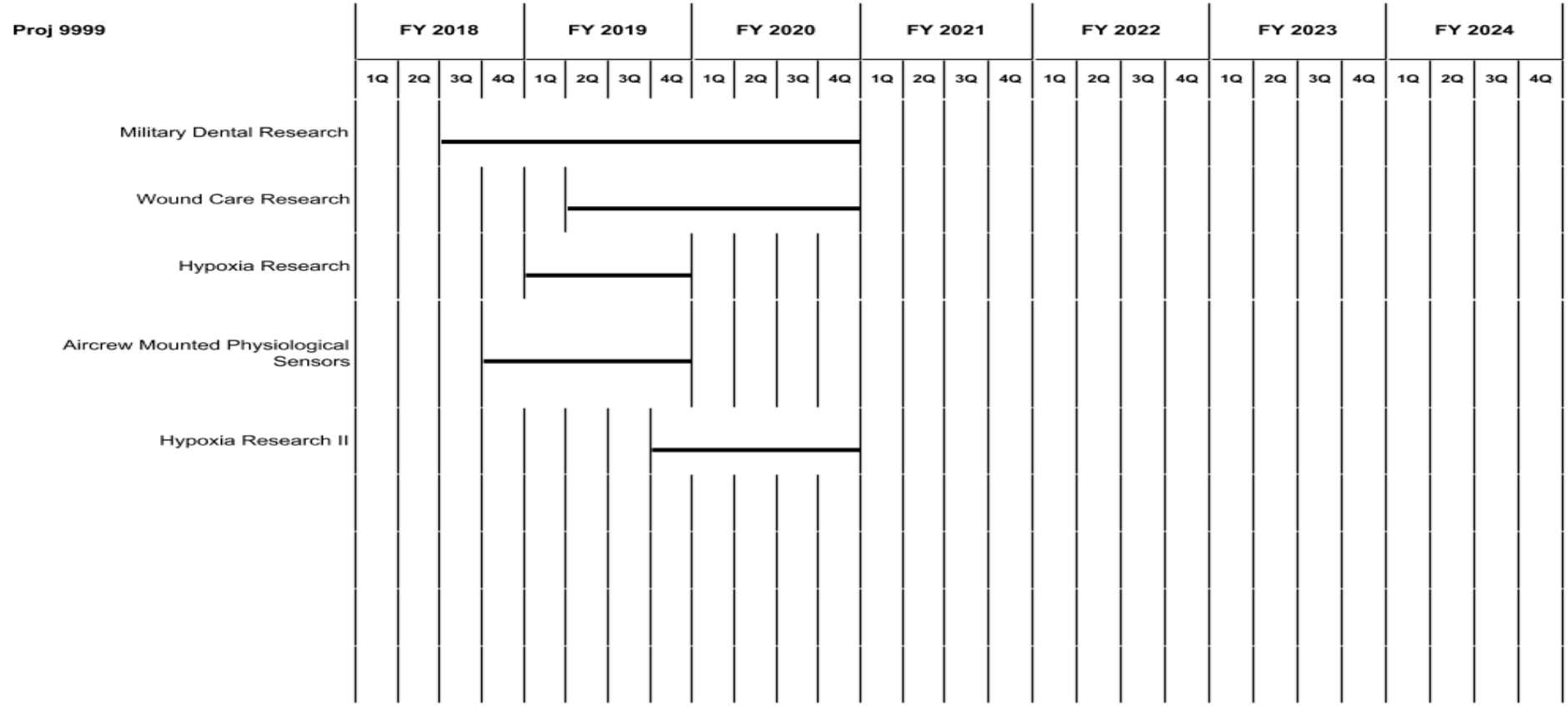
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Congressional Add - Wound Care Research | TBD | TBD : Not Specified | 31.932 | 9.657 | Mar 2019 | 15.000 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 56.589 | - |
| Congressional Add - Military Dental Research | Allot | Naval Medical Research Unit - San Antonio : San Antonio, TX | 8.921 | 4.863 | Jun 2018 | 5.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 18.784 | - |
| Congressional Add - Military Dental Research | MIPR | USAISR Dental & Craniofacial Trauma Research Dir. : San Antonio, TX | 8.672 | 4.794 | Jun 2018 | 5.000 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 18.466 | - |
| Congressional Add - Hypoxia Research | Various | Various : Not Specified | 0.000 | 4.828 | Oct 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.828 | - |
| Congressional Add - Aircrew Mounted Physiological Sensors | Various | Various : Not Specified | 0.000 | 2.897 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.897 | - |
| Congressional Add - Hypoxia Research II | Various | Various : Not Specified | 0.000 | 0.000 | | 5.000 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 5.000 | - |
| Congressional Adds | Various | Various : Not Specified | 82.776 | 0.000 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 82.776 | - |
| | | **Subtotal** | 132.301 | 27.039 | | 30.000 | | 0.000 | | - | | 0.000 | 0.000 | 189.340 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 132.301 | 27.039 | | 30.000 | | 0.000 | | - | | 0.000 | 0.000 | 189.340 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604771N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604771N / *Medical Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Military Dental Research: Schedule Detail | 3 | 2018 | 4 | 2020 |
| Wound Care Research: Schedule Detail | 2 | 2019 | 4 | 2020 |
| Hypoxia Research: Schedule Detail | 1 | 2019 | 4 | 2019 |
| Aircrew Mounted Physiological Sensors: Schedule Detail | 4 | 2018 | 4 | 2019 |
| Hypoxia Research II: Schedule Detail | 4 | 2019 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604777N *I Navigation/Id System* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 589.152 | 74.984 | 126.026 | 40.755 | - | 40.755 | 48.907 | 48.451 | 43.371 | 43.251 | Continuing | Continuing |
| 0253: *Nav & Electro-Optical Supt* | 50.734 | 7.250 | 35.963 | 36.532 | - | 36.532 | 37.339 | 37.724 | 38.892 | 38.681 | Continuing | Continuing |
| 0676: *Improve ID Development* | 46.862 | 2.385 | 2.405 | 2.335 | - | 2.335 | 9.645 | 8.767 | 2.481 | 2.531 | Continuing | Continuing |
| 0921: *NAVSTAR GPS Equipment* | 305.643 | 63.519 | 80.675 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 449.837 |
| 1253: *Combat Ident System* | 185.913 | 1.830 | 1.983 | 1.888 | - | 1.888 | 1.923 | 1.960 | 1.998 | 2.039 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 5.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.000 |

**Note**

Funding for the following project has been realigned out of PE 0604777N into PE 0604280N as part of Program Element Consolidation starting in FY 2020: Project 0921 (NAVSTAR GPS Equipment).

**A. Mission Description and Budget Item Justification**

Reliable and secure navigation and positive identification (ID) systems are essential elements of battle management in the naval environment. The Photonics Imaging System (0253) is a non-hull penetrating replacement for existing optical periscopes. The Photonics Imaging System exploits a wide portion of the electro-magnetic spectrum utilizing advanced Electro-Optic/thermal imaging, and communications intercept/Electronic Warfare Support (ES). The Integrated Submarine Imaging System (ISIS) (0253) is a back fit system to integrate all imaging capabilities on existing submarine classes. The Combat Identification System (CIS) project (1253) for Mark XIIA, and Improved Identification Development (0676) for AN/UPX-29(V), covers the Mark XIIA Mode 5 upgrade to the existing Mark XII family of systems that is Joint and North Atlantic Treaty Organization (NATO) interoperable. Per OSD direction, NATO participation is encouraged and performance data is exchanged to ensure the opportunity for interoperability with allied identification systems is maximized. In addition to distinguishing friend from foe for weapons employment, the Navy requires secure, jam resistant Identification Friend or Foe (IFF) systems for battle group air defense management and air traffic control. Identification is multifaceted and includes information received from several sensors (both cooperative and non-cooperative systems).

Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) project (0921) encompasses the Navy's efforts to pace the growing threat to GPS Navigation through the fielding of new GPS receivers, Anti-Jam (AJ) Antennas, and Assured Position Navigation and Timing (A-PNT) technologies across all Navy platform types. NAVSTAR GPS is a group of A-PNT systems that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity, and precise time data. NAVSTAR GPS provides A-PNT capability to Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) and combat systems in standalone and networked architectures throughout air and maritime domains. This project is comprised of four distinct efforts: Sea Navigation Warfare (NAVWAR), GPS-based Position, Navigation, and Timing (PNT) Service (GPNTS), Air Navigation Warfare (NAVWAR) and GPS Modernization. Sea NAVWAR provides AJ antennas and GPNTS provides GPS receivers and A-PNT technology to surface platforms, and Air NAVWAR provides AJ antennas and GPS Modernization provides GPS receivers to air platforms. Research, Development, Testing and Evaluation (RDT&E) funds are used to perform all the non-recurring GPS Surface Ship, Submarine and Aircraft Development, Integration, and Testing efforts in support of NAVSTAR GPS.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604777N *I Navigation/Id System* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 92.546 | 121.026 | 138.648 | - | 138.648 |
| Current President's Budget | 74.984 | 126.026 | 40.755 | - | 40.755 |
| Total Adjustments | -17.562 | 5.000 | -97.893 | - | -97.893 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 5.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -1.542 | 0.000 | | | |
| • SBIR/STTR Transfer | -1.570 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -97.783 | - | -97.783 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.110 | - | -0.110 |
| • Congressional Directed Reductions Adjustments | -14.450 | - | - | - | - |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Micro-IFF Component* | 0.000 | 5.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 5.000 |
| Congressional Add Totals for all Projects | 0.000 | 5.000 |

**Change Summary Explanation**

Beginning in FY 2020, Project 0921 was realigned from Program Element (PE) 0604777N into PE 0604280N due to budget line item consolidation.

Program:

Proj: 0921 Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) Equipment: As a result of hardware contract delays for the EGI-M GPS receivers and subsequent Prime Vendor Integration (PVI) contract delays, GPS Modernization withstood FY 2018 and FY 2019 budget reductions with minimal impact. F/A-18E/F, MV-22B, and CMV-22B air platforms equipped with MAGR2K-M GPS receivers will move forward with PVI efforts. F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J air platforms with EGI-M GPS Receivers will move forward with critical risk reduction efforts to ensure Navy specific requirements are met in support of hardware development and PVI efforts.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0253 / *Nav & Electro-Optical Supt* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0253: *Nav & Electro-Optical Supt* | 50.734 | 7.250 | 35.963 | 36.532 | - | 36.532 | 37.339 | 37.724 | 38.892 | 38.681 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The FY20 Navigation and Electro-Optical (E-O) support program develops submarine E-O and imagery systems and equipment that will improve submarine imaging capability in the areas of: ship safety, Intelligence, Surveillance and Reconnaissance (ISR), and tactical control (contact management in the littorals). The Department of the Navy established the Integrated Submarine Imaging System (ISIS) to rapidly field the Type 18 periscope, Periscope Acquisition, Tracking, and Ranging with Improved Observation Techniques (PATRIOT) rangefinder, Type 8 Mod 4 Infra-Red (IR) periscope systems, and integrate existing periscope imagery systems into a single imaging system for installation on board SSN 688 class and SEAWOLF class submarines. The ISIS baseline also includes the Imaging System with the Photonics Mast (PM) and all configurations of Low Profile Photonics Mast (LPPM) onboard VIRGINIA and Photonics Mast Variant (PMV) onboard SSGN class submarines. The PM, LPPM, and PMV design exploit a wide portion of the electro-magnetic spectrum through advanced E-O and thermal imaging and Electronic Warfare Support (ES)/ communications intercept. The Common Submarine Imaging System (CSIS) capability development document (CDD), that covers both ISIS and Legacy Imaging systems was approved 22 Dec 2011 with an updated CDD approved on 15 Mar 2018. The CDD is used to fully integrate the ISIS program of record into the submarines force rapid Technical Insertion/Advanced Processor Build (TI/APB) process and to incorporate Fleet-endorsed requirements such as the LPPM. The $0.569M FY20 inflation increase continues the FY19 investment in imaging sensors and algorithms to improve submarine operations in high intensity littoral environments, intelligence gathering, real time imagery and support the safe and effective employment of surveillance and weapons systems. In FY20 these funds will continue the multi-year development of the Type 20 (previously named TOTIM) mast which will provide a modular mast with vastly increased capability, reduced maintenance costs and increased development flexibility with new reconfigurable mast sensors. Furthermore, this funding will improve the software algorithms and inboard hardware for the Type 20 mast and support non-recurring inboard hardware engineering activities which develop the Technical Insertion kits installed in all submarine classes that were previously funded with procurement (BLI 0840) funds which develop the Technical Insertion kits installed in all submarine classes. Finally, this inflation increase funds the TI-18/APB-17 688 Development Testing that verifies software improvements funded in previous fiscal years.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** ISIS and Photonics common software and hardware capabilities development and obsolescence. | 5.567 | 7.436 | 22.589 | 0.000 | 22.589 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Design and develop additional complex and sophisticated imaging algorithms, upgrade software and hardware to process the significant increase in imaging data provided by Type 20 mast video and enable system to operate the mast. The increased data rates from the Type 20 provide enhanced situational awareness and effectiveness. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0253 / *Nav & Electro-Optical Supt* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue Advanced Processor Build (APB) productionization efforts, to add additional functionality including Image Contact Follower Improvements, Small Craft Detection, and Automatic Target Recognition.<br>***FY 2020 Base Plans:***<br>The $15.153M increase is (a) $0.149M inflationary increase in the annual investment advanced development of sensitive software imaging algorithms to maintain imaging system superiority, and (b) a $15.004M transfer of non-recurring engineering (NRE) that has been funded in prior years under OPN BLI 0840. This NRE provides the necessary engineering, technical program, project and configuration management of the Technical Insertion (TI) kit (software and hardware) baseline for each class of submarine.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $15.153M increase is to fund recurring development ($0.149M) of improved inboard hardware and software systems and to realign ($15.004M) to RDT&E a portion of longstanding NRE efforts funded in OPN BLI 0840. | | | | | |
| ***Title:*** Type 20 Mast (previously titled Task-Oriented Technology Insertion Mast (TOTIM)) | 1.002 | 27.832 | 13.234 | 0.000 | 13.234 |
| ***Articles:*** | - | 1 | - | - | - |
| ***FY 2019 Plans:***<br>Design, develop, fabricate, and verify testing of the new Type 20 mast. Development will utilize open architecture and a modular design to reduce life cycle costs and enable flexibility for future capability upgrades. Specific efforts include:<br>-Start development of the Type 20 technical data package<br>-Execute design reviews<br>-Start developing of the test plans<br>-Start designing counter detection vulnerability reduction<br>-Start procuring and fabricating the Type 20 test article for delivery in FY20<br>-Execute test events and environmental qualification testing of the Type 20 mast<br>***FY 2020 Base Plans:***<br>The $14.598M decrease in funding completes the Type 20 mast development, fabrication and verification. Specific efforts include:<br>- Continue the test plans and commencement of test activities<br>- Continue the counter detection vulnerability reduction<br>- Complete fabrication of the Type 20 test article | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0253 / *Nav & Electro-Optical Supt* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Develop enhancements to be incorporated into Type 20 mast<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $14.598M decrease is a result of reduced funding required for the completion of the development of a new mast. Type 20 will provide state of the art visual imagery and other sensors which will increase situational awareness (especially in high intensity littoral operations), improve safety of navigation and tactical decision-making, and further advance the safe and effective employment of surveillance and weapons systems. Type 20 development will utilize open architecture and a modular design to reduce life cycle costs and enable flexibility for future capability upgrades. As a modular mast, the Type 20 mast will have additional enhancements added in future years. | | | | | |
| ***Title:*** Imaging Systems Test Efforts.<br>***Articles:***<br>***FY 2019 Plans:***<br>TI-16 / APB-15 VA Operational Testing (OT) to verify capability increases to previous algorithm builds including Image Fusion, Automated Detection/Tracking, and Synthetic Horizon.<br>***FY 2020 Base Plans:***<br>The $0.014M increase is for TI-18/APB-17 688 Development Testing (DT) to validate sensitive algorithms incorporated into APB-17.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $0.014M increase is an inflation adjustment which will fund the design, management, and evaluation results of the<br>Development Test for TI-18 / APB-17 for modernizing 688 boats. | 0.681<br>- | 0.695<br>- | 0.709<br>- | 0.000<br>- | 0.709<br>- |
| **Accomplishments/Planned Programs Subtotals** | 7.250 | 35.963 | 36.532 | 0.000 | 36.532 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/2013: *Photonics Mast* | 39.648 | 40.442 | 41.251 | - | 41.251 | 42.076 | 42.918 | 43.776 | 44.652 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0253 / *Nav & Electro-Optical Supt* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604558N: *VIRGINIA Class Design Development* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • RDT&E/0603562N: *Advanced Submarine Support Equipment (ASSEP)* | 4.120 | 4.307 | 4.672 | - | 4.672 | 4.777 | 4.866 | 4.977 | 5.077 | Continuing | Continuing |
| • OPN/0840: *Sub Periscope, Imaging Equip. and Supt Equip Program* | 172.740 | 178.421 | 169.969 | - | 169.969 | 211.640 | 281.297 | 290.510 | 291.727 | Continuing | Continuing |
| • RDT&E/0603595N: *COLUMBIA Class Design Development* | 1.024 | 1.118 | 1.115 | - | 1.115 | 0.898 | 0.936 | 0.954 | 0.974 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy for AN/BVY-1 Integrated Submarine Imaging System (ISIS) is dated 07 Jul 2003. The Acquisition Program Baseline Agreement for ISIS Advanced Processor Builds 11, 13 and 15 is dated 07 Mar 2013. The Single Acquisition Management Plan (SAMP) for the LPPM is dated 01 Jul, 2013. The ISIS will provide mission critical, all weather, visual, and electronic search, digital image management, indication, warning, and platform architecture interface capabilities for SSN 688, SSN 21, SSN 774 and SSGN class submarines. The Single Acquisition Management Plan (SAMP) for the Type 20 Mast is dated 07 Jul, 2017.

**E. Performance Metrics**

Successful application of system engineering processes. Design and development of improvements. The Rapid Development and Deployment (RDD) program goal is to respond to urgent operational needs within 30 days and provide for rapid development and fielding of prototype solutions within 270 days.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0253 / *Nav & Electro-Optical Supt* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | C/CPIF | Lockheed Martin : Manassas, VA | 16.765 | 2.075 | Dec 2017 | 2.377 | Dec 2018 | 9.444 | Dec 2019 | - | | 9.444 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NUWC : Newport, RI | 16.724 | 0.810 | Oct 2017 | 2.323 | Dec 2018 | 2.354 | Nov 2019 | - | | 2.354 | Continuing | Continuing | Continuing |
| Hardware Development | C/CPIF | Lockheed Martin : Manassas, VA | 7.688 | 2.636 | Jun 2018 | 2.689 | Dec 2018 | 10.743 | Dec 2019 | - | | 10.743 | Continuing | Continuing | Continuing |
| Hardware Development - Type 20 | C/CPIF | Lockheed Martin : Manassas, VA | 0.000 | 1.002 | Jul 2018 | 27.832 | Dec 2018 | 13.234 | Dec 2019 | - | | 13.234 | 0.000 | 42.068 | - |
| | | **Subtotal** | 41.177 | 6.523 | | 35.221 | | 35.775 | | - | | 35.775 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | NUWC : Newport, RI | 7.818 | 0.426 | Oct 2017 | 0.435 | Oct 2018 | 0.444 | Oct 2019 | - | | 0.444 | Continuing | Continuing | Continuing |
| Development Test & Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 1.160 | 0.255 | Oct 2017 | 0.260 | Oct 2018 | 0.265 | Oct 2019 | - | | 0.265 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.978 | 0.681 | | 0.695 | | 0.709 | | - | | 0.709 | Continuing | Continuing | N/A |

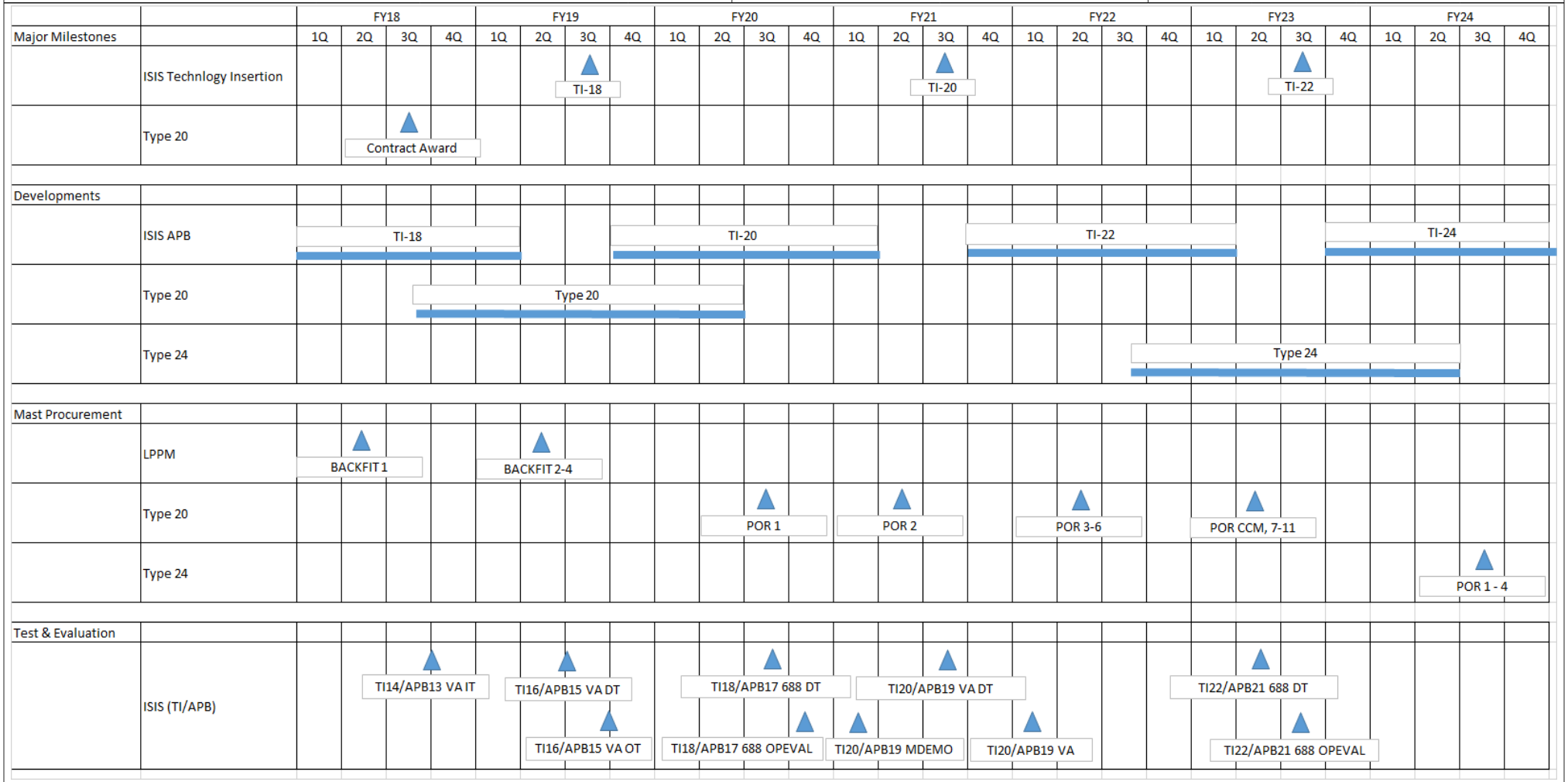
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | NAVSEA : Washington, DC | 0.579 | 0.046 | Oct 2017 | 0.047 | Oct 2018 | 0.048 | Oct 2019 | - | | 0.048 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.579 | 0.046 | | 0.047 | | 0.048 | | - | | 0.048 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 50.734 | 7.250 | | 35.963 | | 36.532 | | - | | 36.532 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0253 / *Nav & Electro-Optical Supt* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0253 / *Nav & Electro-Optical Supt* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Nav & Electro-Optical Supt*** | | | | |
| Major Milestones: ISIS Technology Insertion: ISIS Technology Insertion Fielding (TI-18) | 3 | 2019 | 3 | 2019 |
| Major Milestones: ISIS Technology Insertion: ISIS Technology Insertion Fielding (TI-20) | 3 | 2021 | 3 | 2021 |
| Major Milestones: ISIS Technology Insertion: ISIS Technology Insertion Fielding (TI-22) | 3 | 2023 | 3 | 2023 |
| Major Milestones: Type 20: Contract Award | 3 | 2018 | 3 | 2018 |
| Developments: ISIS APB: ISIS TI-18 | 1 | 2018 | 1 | 2019 |
| Developments: ISIS APB: ISIS TI-20 | 4 | 2019 | 1 | 2021 |
| Developments: ISIS APB: ISIS TI-22 | 4 | 2021 | 1 | 2023 |
| Developments: ISIS APB: ISIS TI-24 | 4 | 2023 | 4 | 2024 |
| Developments: Type 20 Development: Type 20 | 3 | 2018 | 2 | 2020 |
| Mast Procurement: LPPM (Buy): Backfit 1 | 2 | 2018 | 2 | 2018 |
| Mast Procurement: LPPM (Buy): Backfit 2 - 4 | 2 | 2019 | 2 | 2019 |
| Mast Procurement: Type 20 (Buy): POR 1 | 3 | 2020 | 3 | 2020 |
| Mast Procurement: Type 20 (Buy): POR 2 | 2 | 2021 | 2 | 2021 |
| Mast Procurement: Type 20 (Buy): POR 3-6 | 2 | 2022 | 2 | 2022 |
| Mast Procurement: Type 20 (Buy): POR CCM, 7-11 | 2 | 2023 | 2 | 2023 |
| Mast Procurement: Type 24 Development: Type 24 | 3 | 2022 | 2 | 2024 |
| Mast Procurement: Type 24 (Buy): POR 1-4 | 3 | 2024 | 3 | 2024 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-14/APB 13 VA IT | 2 | 2018 | 2 | 2018 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-16/APB 15 VA DT | 3 | 2019 | 3 | 2019 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-16/APB 15 VA OT | 3 | 2019 | 3 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0253 / *Nav & Electro-Optical Supt* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-18/APB 17 688 DT | 3 | 2020 | 3 | 2020 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-18/APB 17 688 OPEVAL | 4 | 2020 | 4 | 2020 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-20/APB 19 MDEMO | 1 | 2021 | 1 | 2021 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-20/APB 19 VA DT | 3 | 2021 | 3 | 2021 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-20/APB 19 VA OT | 1 | 2022 | 1 | 2022 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-22/APB 21 688 DT | 2 | 2023 | 2 | 2023 |
| Test & Evaluation: ISIS (TI/APB): Test & Evaluation - ISIS TI-22/APB 21 688 OPEVAL | 3 | 2023 | 3 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0676 / *Improve ID Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0676: *Improve ID Development* | 46.862 | 2.385 | 2.405 | 2.335 | - | 2.335 | 9.645 | 8.767 | 2.481 | 2.531 | Continuing | Continuing |
| Quantity of RDT&E Articles | | 1 | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Reliable and secure navigation and positive identification (ID) systems are essential elements of battle management in the naval environment. In addition to providing platform identification for weapons employment, the Navy requires secure, jam resistant Identification Friend or Foe (IFF) systems for battle group air defense management and Air Traffic
Control. The Improved ID Development project addresses the Mark XIIA Mode 5 and Mode S upgrades to the existing AN/UPX-29(V) Mark XII family of systems that is Joint and North Atlantic Treaty Organization interoperable. The AN/UPX-29(V) Interrogator System is comprised of the Interrogator Set AN/UPX-24(V), OE-120()/UPX Antenna Group, and Mark XII or Mark XIIA equipment such as AN/UPX-37, AN/UPX-41(C) or AN/UPX-45(C) Digital Interrogators and associated equipment. Additionally, the Improved ID Development project may include product improvements designed to be installed through upgrade and deficiency correction studies, which in turn become engineering changes to other
IFF solutions.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** AN/UPX-29 (V) - OE-120()/UPX Antenna Tech Refresh | 1.720 | 1.611 | 1.544 | 0.000 | 1.544 |
| ***Articles:*** | 1 | - | - | - | - |
| ***Description:*** Engineering and integration development for antenna group OE-120()/UPX antenna tech refresh. Develop design studies and Analysis of Alternatives, draft specifications, and perform system development and integration efforts and support mission requirements, to include engineering investigations and Engineering Change Proposal (ECP) development to support mission readiness for IFF systems. | | | | | |
| ***FY 2019 Plans:***<br>Establish tech-refresh configuration at In-Service Engineering Activity lab and land-based test sites. | | | | | |
| ***FY 2020 Base Plans:***<br>Conduct platform integration testing at In-Service Engineering Activity lab and land-based test sites. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 is due to OE-120()/UPX transitioning to production cut-in. | | | | | |
| ***Title:*** Mark XIIA Mode 5 and Mode S Improvement for AN/UPX-29(V) | 0.334 | 0.371 | 0.378 | 0.000 | 0.378 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0676 / *Improve ID Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Engineering, development, and integration of improvements to Mark XIIA Shipboard Identification Friend or Foe (IFF) Systems, including, but not limited to the AN/UPX-29(V) Interrogator System, which is comprised of the Interrogator Set AN/UPX-24, OE-120()/UPX Antenna Group, and Mark XII or Mark XIIA equipment such as AN/UPX-37, AN/UPX-41 or AN/UPX-45 Digital Interrogators. Funds development and integration of Mark XIIA Mode 5 and Mode Select (S) Improvements to the AN/UPX-29(V) systems on CG47, DDG51, LHD1, LPD17, LHA6, and CVN68, CVN78, and future ship classes. Correct software and performance deficiencies from Integrated Test and Operational Test, Aegis, and other Combat System Integration events to support Combat System integration with Aegis Weapon Systems (AWS), Ship Self Defense System (SSDS), Advanced Combat Direction System (ACDS), or Air Traffic Control Systems using Mark XIIA equipment to include engineering investigations, Engineering Change Proposal development, and testing. Provides core Integrated Logistics Support documentation; formalizes hardware/software configuration: finalizes technical/ design data, resolves testing anomalies, and integrates with shipboard training systems. | | | | | |
| ***FY 2019 Plans:***<br>Continue AN/UPX-29(V) Interrogator System integration testing with Mode 5/Mode S capable AN/UPX-45 Digital Interrogator in preparation for deployment to Aegis and Ship Self Defense System (SSDS) platforms. Evaluate inter-operability test data to validate planned combat system software design changes. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue AN/UPX-29(V) Interrogator System integration testing with Mode 5/Mode S capable AN/UPX-45 Digital Interrogator in preparation for deployment to Aegis and Ship Self Defense System (SSDS) platforms. Evaluate inter-operability test data to validate planned combat system software design changes. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY 2019 to FY 2020 is due to inflation. | | | | | |
| ***Title:*** AN/UPX-29(V) Management Support | 0.331 | 0.423 | 0.413 | 0.000 | 0.413 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Engineering and Program Management of the AN/UPX 29 (V). Perform system integration efforts. | | | | | |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0676 / *Improve ID Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Support logistics and technical data management for the AN/UPX 29 (V) Mode 5/Mode S integration. Evaluate in-service OE-120 antenna systems for maximum service life and create corresponding OE-120 retro-fit schedule.<br>***FY 2020 Base Plans:***<br>Support logistics and technical data management for the AN/UPX 29 (V) Mode 5/Mode S integration. Develop and submit ship change documents for OE-120 retro-fit.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 is due to phasing changes for management support. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.385 | 2.405 | 2.335 | 0.000 | 2.335 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2851: *ID Systems* | 21.239 | 22.777 | 26.059 | - | 26.059 | 25.232 | 49.464 | 57.259 | 58.402 | 297.625 | 851.160 |

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy is to develop Mode 5 Engineering Change Proposals for modern Mark XII Identification Friend or Foe (IFF) equipment and integrate into all Navy Combat Weapons systems platforms and augment the Navy's Cooperative Identification Capability to include Mode 5.

**E. Performance Metrics**

Achieve Full Rate Production Decision and Initial Operational Capability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0676 / *Improve ID Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development | WR | NAWCAD : St Inigoes, MD | 9.313 | 0.000 | | 1.139 | Nov 2018 | 1.062 | Nov 2019 | - | | 1.062 | Continuing | Continuing | Continuing |
| Ship Integration | WR | NAWCAD : St Inigoes, MD | 2.462 | 0.000 | | 0.115 | Nov 2018 | 0.117 | Nov 2019 | - | | 0.117 | 0.000 | 2.694 | - |
| Systems Engineering | WR | NAWCAD : St Inigoes, MD | 6.229 | 0.000 | | 0.357 | Nov 2018 | 0.365 | Nov 2019 | - | | 0.365 | 0.000 | 6.951 | - |
| OE-120 Tech Refresh | SS/FFP | BAE : Nashua, NH | 13.763 | 1.720 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.483 | 15.483 |
| | | **Subtotal** | 31.767 | 1.720 | | 1.611 | | 1.544 | | - | | 1.544 | Continuing | Continuing | N/A |

**Remarks**

Decrease in FY19 for OE-120 Tech Refresh efforts is due to the transition from OEM to USG. Primary Hardware Development, Ship Integration, and Systems Engineering increases in FY19 are due to the transition from OEM to USG for establishment of OE-120 Tech Refresh configuration at In-Service Engineering Activity (ISEA) and Land Base Test Site (LBTS) labs.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Configuration Management | WR | NAWCAD : St Inigoes, MD | 0.169 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.169 | - |
| ILS | WR | NAWCAD : St Inigoes, MD | 2.547 | 0.239 | Nov 2017 | 0.075 | Nov 2018 | 0.076 | Nov 2019 | - | | 0.076 | 0.000 | 2.937 | - |
| Software Development | WR | NAWCAD : St Inigoes, MD | 5.535 | 0.000 | | 0.197 | Nov 2018 | 0.201 | Nov 2019 | - | | 0.201 | 0.000 | 5.933 | - |
| Technical Data | WR | NAWCAD : St Inigoes, MD | 1.874 | 0.095 | Nov 2017 | 0.099 | Nov 2018 | 0.101 | Nov 2019 | - | | 0.101 | 0.000 | 2.169 | - |
| Training | WR | NAWCAD : St Inigoes, MD | 0.200 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| Engineering | WR | NAWCAD : PAX River, MD | 0.244 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.244 | - |
| | | **Subtotal** | 10.569 | 0.334 | | 0.371 | | 0.378 | | - | | 0.378 | 0.000 | 11.652 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0676 / *Improve ID Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Remarks** | | | | | | | | | | | | | | | |
| Software development cost increases for evaluation of Mode 5/Mode S interoperability test data from combat system software design changes. | | | | | | | | | | | | | | | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year T&E costs no longer funded in FYDP | WR | NAWCAD : St Inigoes, MD | 2.559 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.559 | - |
| | | **Subtotal** | 2.559 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.559 | N/A |

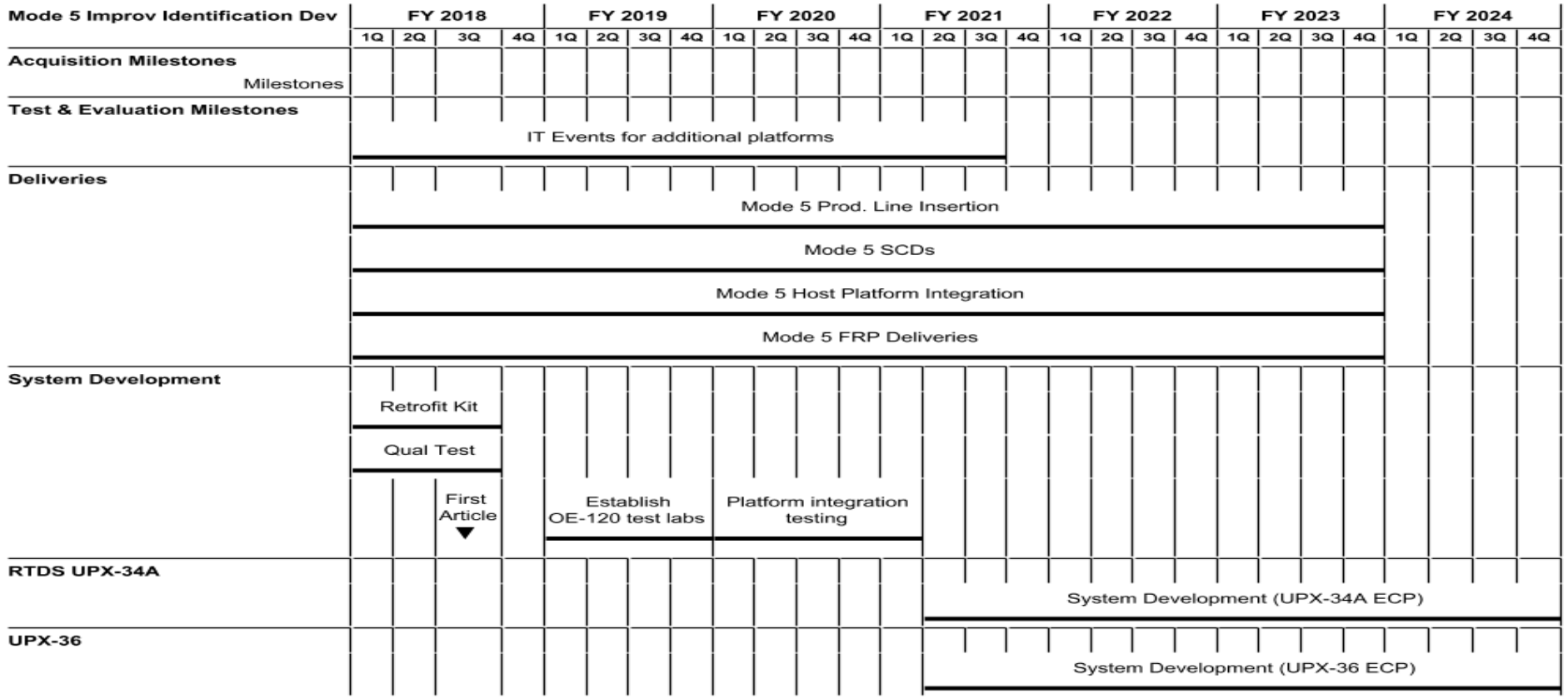
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | American Electronics : California, MD | 1.967 | 0.331 | Nov 2017 | 0.423 | Nov 2018 | 0.413 | Nov 2019 | - | | 0.413 | 0.000 | 3.134 | 2.813 |
| | | **Subtotal** | 1.967 | 0.331 | | 0.423 | | 0.413 | | - | | 0.413 | 0.000 | 3.134 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 46.862 | 2.385 | | 2.405 | | 2.335 | | - | | 2.335 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0676 / *Improve ID Development* |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0676 / *Improve ID Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Mode 5 Improv Identification Dev*** | | | | |
| Test & Evaluation Milestones: IT Events for additional platforms | 1 | 2018 | 3 | 2021 |
| Deliveries: Mode 5 - Production Line Insertion | 1 | 2018 | 4 | 2023 |
| Deliveries: Mode 5 - Prepare and Evaluate ECPs/SCDs | 1 | 2018 | 4 | 2023 |
| Deliveries: Mode 5 - Host Platform Integrations | 1 | 2018 | 4 | 2023 |
| Deliveries: Mode 5 - FRP Deliveries | 1 | 2018 | 4 | 2023 |
| System Development: Retrofit Kit | 1 | 2018 | 3 | 2018 |
| System Development: Qual Test | 1 | 2018 | 3 | 2018 |
| System Development: OE-120 Tech Refresh First Article Delivery | 3 | 2018 | 3 | 2018 |
| System Development: Establish ISEA and LBTS OE-120 tech refresh labs. | 1 | 2019 | 4 | 2019 |
| System Development: Platform integration testing | 1 | 2020 | 1 | 2021 |
| RTDS UPX-34A: System Development (UPX-34A ECP) | 2 | 2021 | 4 | 2024 |
| UPX-36: System Development (UPX-36 ECP) | 2 | 2021 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0921: *NAVSTAR GPS Equipment* | 305.643 | 63.519 | 80.675 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 449.837 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned out of PE 0604777N Project 0921 (NAVSTAR GPS Equipment), into PE 0604280N as part of RDTEN PE Consolidation starting in FY 2020.

**A. Mission Description and Budget Item Justification**

Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) project (0921) encompasses the Navy's efforts to pace the growing threat to GPS Navigation through the fielding of new GPS receivers, Anti-Jam (AJ) Antennas, and Assured Position Navigation and Timing (A-PNT) technologies across all Navy platform types. NAVSTAR GPS is a group of A-PNT systems that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity, and precise time data. NAVSTAR GPS provides A-PNT capability to Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) and combat systems in standalone and networked architectures throughout air and maritime domains. This project is comprised of four distinct efforts: Sea Navigation Warfare (NAVWAR), GPS-based PNT Service (GPNTS), Air NAVWAR and GPS Modernization. Sea NAVWAR provides AJ antennas and GPNTS provides GPS Receivers and A-PNT technology to surface platforms, and Air NAVWAR provides AJ antennas and GPS Modernization provides GPS receivers to air platforms. GPS continues to be integrated in all Department of Defense (DoD) platforms and the development of enhanced and protected GPS is a national security priority. Research, Development, Testing and Evaluation (RDT&E) funds are used to perform all the non-recurring GPS Surface Ship, Submarine and Aircraft Development, Integration, and Testing efforts in support of NAVSTAR GPS.

The Air and Sea NAVWAR programs provide continued access to GPS information in a denied or impeded electronic environment. Development efforts for both programs provide improvements to various platform type antennas and ensure compatibility with the new Military Code (M-Code) signal. The Air NAVWAR program continues integration efforts using GPS Antenna System (GAS-1), Advanced Digital Antenna Production (ADAP), and other AJ antennas on air platforms while investigating smaller AJ antennas for space constrained platforms and aircraft with unique requirements. The Sea NAVWAR program integrates AJ antennas onto surface and subsurface platforms. The Sea NAVWAR program will continue to research the viability and development of smaller AJ antennas for space-constrained platforms. The program continues to support the Submarine Anti-Jam GPS Enhancement (SAGE) antenna development which integrates AJ capability into the submarine Multi-Function Mast (OE-538B) antenna system.

The GPNTS system is being developed to serve as the primary A-PNT system for the surface Navy to ensure reliable PNT capability and interoperability insertion into GPS receivers and associated C4ISR and Combat Systems in a denied environment. GPNTS pairs with AJ antennas and provides precise A-PNT data required for combat, weapons, command, control, communications, navigation, and other systems, as well as providing the time synchronization critical for network environments. GPNTS will back fit current PNT/GPS systems as well as serve as a forward fit for new platforms. GPNTS is an Open Architecture (OA) development, enabling rapid software and hardware based capability improvements to be inserted without a requirement for single-source contracting. GPNTS will host the Air Force GPS Directorate-developed Military GPS User Equipment (MGUE) card, allowing access to the new GPS M-Code signal. GPNTS will provide more robust and secure GPS/ PNT capabilities than is currently in the Fleet. The system will provide the capability to migrate non-real time GPS data toward a Common Computing Environment

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

(CCE) and provide a path for the integration of advanced navigation systems and sensors. GPNTS provides A-PNT capability to C4ISR and Combat Systems in standalone and networked architectures throughout maritime domains.

GPS Modernization executes the Navy's integration of MGUE being developed by the Air Force GPS Directorate on Navy air platforms. This effort provides Navy platforms improved access to GPS signals in challenged and jammed environments. Because of the number and diversity of all of the Navy's air and weapons platforms, this project will consist of multiple parallel efforts that integrate different M-code GPS receivers into different type model series aircraft across many program offices with central coordination and management of funding and priorities by GPS Modernization. Each platform will require unique prime vendor integration and testing that includes software updates to avionics and mission computers as well as modifications to the airframe based on Size, Weight and Power and Cost (SWaP-C) requirements. Modernized Global Positioning System (GPS) receivers will utilize the new M-Code GPS Signal in Space, incorporate enhanced cryptology, deliver greater position and time accuracy, and provide improved protection against signal spoofing as compared to legacy receivers. Additionally, GPS Modernization delivers increased GPS Anti-Jam (AJ) protection and enables blue force GPS electronic attack. This effort supports Navy compliance with Public Law 111-383 which prohibits spending funds on non-Military Code (M-Code) GPS user equipment after FY 2017.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Sea Navigation Warfare (NAVWAR) | 6.109 | 3.370 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Sea NAVWAR provides the Warfighter continued access to GPS through the use of AJ Antenna Systems designed to counter GPS Electronic Warfare threats due to intentional and unintentional interference on surface and subsurface platforms through the continued development of AJ antennas. The program is continuing the Submarine Anti-Jam GPS Enhancement (SAGE) antenna development, which integrates AJ capability into the submarine Multi-Function Mast (OE-538B). Sea NAVWAR will continue to research the viability and development of smaller AJ antennas for platforms with Size, Weight and Power and Cost (SWaP-C) restrictions and will ensure compatibility with the Military Code (M-Code) signal. | | | | | |
| ***FY 2019 Plans:***<br>Complete electromagnetic compatibility and shock improvement for Submarine Anti-Jam Global Positioning System (GPS) Enhancement (SAGE) integration into the submarine Multi-Function Mast (OE-538B) antenna system.<br><br>Complete Engineering Change (EC) process for implementation of the OE-538B antenna system on all submarine classes.<br><br>Continue government oversight, system engineering, logistics, contracts, and programmatic management efforts for the SAGE and integration into the OE-538B antenna system development. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Conduct OE-538B production representative article (PRA) factory acceptance testing and Functional Configuration Audit (FCA), and Physical Configuration Audit (PCA).<br><br>Accept delivery of OE-538B PRA and conduct Government Acceptance Test.<br><br>Commence testing of Radio Frequencies Distribution and Control System (RFDACS) with OE-538B PRA in the Land Based Submarine Radio Room (LBSRR).<br><br>Commence the following First Article Qualification Testing (FAQT) of SAGE and OE-538B antenna system:<br>- GPS Anti-Jamming<br>- Electromagnetic Interference (EMI)<br>- Vibration<br>- Electromagnetic Pulse (EMP)/High Altitude Electromagnetic Pulse (HEMP)<br>- Underwater Explosion (UNDEX)<br><br>Commence preparation for OE-538B Developmental Testing/Operational Testing (DT/OT) on operational submarine classes.<br><br>Begin requirements analysis and preparations for Environmental Qualification Testing (EQT) of a smaller Military Code (M-code) capable Anti-Jam (AJ) antennas, currently being used by U.S. Army Special Operations community, for Navy maritime requirements on Size, Weight and Power and Cost (SWaP-C) constrained surface platforms.<br><br>***FY 2020 Base Plans:***<br>FY 2020 funding has been realigned to PE 0604280N Project 0921 (NAVSTAR GPS Equipment) as part of PE Consolidation.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY 2020 justification and change explanation is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment). | | | | | |
| ***Title:*** Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS) | 17.689 | 20.055 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | 1 | - | - | - | - |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** GPNTS is the Navy's next generation Assured Position Navigation and Timing (A-PNT) system. GPNTS will provide more robust and secure GPS/PNT capabilities than is currently in the Fleet. GPNTS will replace Navigation Sensor System Interface (NAVSSI) and WRN-6 systems on surface ships. GPNTS will back fit current PNT/GPS systems as well as serve as a forward fit for new platforms. The system contains Selective Availability Anti-spoofing Security Module (SAASM) GPS security architecture with a planned migration to GPS M-Code.<br><br>***FY 2019 Plans:***<br>Continue software defects on the GPNTS software prior to commencing Initial Operational Test and Evaluation (IOT&E).<br><br>Conduct GPNTS Aegis Integration Event (AIE) activities at Wallops Island, VA, to ensure compatibility with specific Aegis Combat System baselines. The AIE is required prior to the installation of GPNTS on the Aegis capable Guided-Missile Destroyer (DDG) IOT&E platform and prior to fielding on platforms with Aegis capability (DDGs and Cruisers (CGs)).<br><br>Conduct GPNTS Ship's Self Defense System (SSDS) Combat Systems Certification activities at Wallops Island, VA, to ensure compatibility with specific SSDS Combat System baselines. SSDS certification is required prior to the installation of GPNTS on SSDS capable platforms; Aircraft Carriers (CVNs) and Amphibious Assault Ships (LHAs/LHDs) in FY 2020.<br><br>Commence the implementation of GPNTS Pre-planned Product Improvement (P3I) technology software enhancements for Assured-Positioning, Navigation, and Timing (A-PNT) sensor suite integration to include: All Source Position Navigation (ASPN) algorithm, Celestial Navigation, Two Way Satellite Time Transfer (TWSTT), Public Key Infrastructure (PKI), Host-Based Security System (HBSS). ASPN, Celestial Navigation, and TWSTT address emerging threats to the GPS signal in a GPS-denied environment. PKI and HBSS provide secure cybersecurity architecture to the GPNTS system to comply with OPNAV Cybersecurity mandates.<br><br>Continue integration of the ONR developed capability, NoGAPSS, into the GPNTS software baseline. The NoGAPSS capability provides additional resiliency for A-PNT data required for combat systems, weapons, navigation, command, control, communications, and other systems, as well as providing the time and frequency synchronization critical to the network infrastructure in a GPS interference or denied environment. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Obtain an Authority to Operate (ATO) from the Navy Authorization Office (NAO) in order to install and operate a GPNTS system onboard a Navy ship.<br><br>Continue the design of a Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS) small Size, Weight and Power and Cost (SWaP-C) solution for smaller surface combatant platforms to include Dock Landing Ship, United States Coast Guard, patrol crafts, Mine Countermeasure, and Military Sealift Command platforms.<br><br>Conduct GPNTS Technical Evaluation prior to Initial Operational Test and Evaluation (IOT&E).<br><br>Conduct GPNTS IOT&E for two rack solution.<br><br>Support Navigation Certification following IOT&E on program selected platforms.<br><br>Begin updates to all Regulatory and Statutory Acquisition documents in support of GPNTS Full Rate Production Decision (FRP).<br>***FY 2020 Base Plans:***<br>FY 2020 funding has been realigned to PE 0604280N Project 0921 (NAVSTAR GPS Equipment) as part of PE Consolidation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY 2020 justification and change explanation is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment). | | | | | |
| ***Title:*** Air Navigation Warfare (NAVWAR) | 13.237 | 10.265 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | 31 | - | - | - | - |
| ***Description:*** Air NAVWAR provides the Warfighter continued access to GPS through the use of Anti-Jam (AJ) Antenna Systems designed to counter GPS Electronic Warfare threats due to intentional and unintentional interference. Air NAVWAR efforts include investigation and testing of emerging technologies to improve AJ capability and technologies such as development of miniaturized very small antenna systems to allow for the | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| capability on small variant aircraft. Efforts will also include development to ensure antennas can accept the new Military Code (M-Code) signal.<br><br>***FY 2019 Plans:***<br>Continue to fund the development and integration of miniaturized AJ antennas to be used for various Size, Weight, and Power Constrained air platforms. Efforts include maturation of antenna solutions, chamber and flight testing, moving toward integration on specific platforms. Efforts will continue to determine air platform specific requirements and solutions.<br><br>Continue effort to upgrade main operation software including development, integration and laboratory testing to incorporate Y-Code Only signal mode functionality for MV-22, E-2D, and MQ-8B/C Fire Scout platforms.<br><br>Continue developmental effort for AJ capability on MQ-8B and MQ-8C to include hardware integration of solution on platform and software testing for safety of flight certification.<br><br>Complete Non-Recurring Engineering (NRE) for platform interface modifications; integration testing; test plan development and updates; test support integration and flight testing for the anti-jam capability on the E-6B air platform.<br><br>Continue efforts to assist with coordination of E-2D platforms with Anti-Jam (AJ) capable antennas in conjunction with a refueling probe upgrade.<br><br>Continue development efforts for a High-Integrity GPS (Global Positioning System) Aided Inertial Navigation System (HI-GAINS) for Unmanned Aerial Systems (UAS) to include fabrication, assembly and testing of the HI-GAINS system.<br><br>Continue developmental test effort to identify a common solution for H-1 helicopter variants to include the AH-1Z and UH-1Y. Start integration of solution on platform with Power test, Environmental test, Weapons Replaceable Assembly (WRA) Box-Level Electromagnetic Interference (EMI) Test, and System-Level EMI Tests.<br><br>Continue to provide subject matter expertise to the MQ-4C platform as it continues the Non-Recurring Engineering (NRE) for platform interface modifications; integration testing; test plan development and updates; test support integration and flight testing for the anti-jam capability on the MQ-4C air platform. | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Conduct GPS Demonstrations and laboratory testing of GPS receivers with associated antennas at Facilities for Antenna and Radar Cross Section (RCS) Measurements (FARM), to include material procurement, testing, and demonstrations. Specific testing and demonstrations of the AN/APY-10 radar system will correct identified deficiencies in the antenna and provide an interim solution for platforms operating in a GPS-denied environment. Additional technology will be tested and demonstrated to compare performance between traditional nulling systems and new beam-steering antenna electronics, collecting data to be used by platforms as they consider future upgrades to antenna systems.<br><br>Continue to support Aviation Assured-Position, Navigation and Timing (A-PNT) efforts by working with Navy Air platforms on navigation requirements and coordinating with surface Navy platforms to leverage synergies. Finalize Aviation Position, Navigation and Timing (PNT) Capabilities Based Assessment (CBA) and determine Assured Position Velocity and Timing (APVT) requirements for F/A-18E/F, MQ-4C and H-60 aircraft according to the Office of the Chief of Naval Operations (OPNAV) N2N6 guidance and prioritization.<br><br>Continue to assist the Fleet with GPS Enterprise Selective Availability Anti-Spoofing Module (SAASM) and Architecture Evolution Plan (AEP) developments, providing subject matter expertise to Naval Air Systems Command (NAVAIR) platforms for SAASM integration and monitor future GPS Directorate SAASM upgrades.<br><br>***FY 2020 Base Plans:***<br>FY 2020 funding has been realigned to PE 0604280N Project 0921 (NAVSTAR GPS Equipment) as part of PE Consolidation.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY 2020 justification and change explanation is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment). | | | | | |
| ***Title:*** Global Positioning System (GPS) Modernization | 26.484 | 46.985 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | 23 | - | - | - |
| ***Description:*** GPS Modernization delivers increased GPS Anti-Jam (AJ) protection through modernized GPS receivers that will utilize the new Military Code (M-Code) GPS Signal in Space, incorporate enhanced cryptology, enable blue force GPS electronic attack, deliver greater position and time accuracy, and provide improved protection against signal spoofing as compared to legacy receivers. This project funds the Navy's integration of M-Code capable GPS receivers being developed by the United States Air Force (USAF) GPS Directorate into | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| various receivers on Navy air platforms. This effort supports Navy's compliance with Public Law 111-383, which requires that all GPS user equipment be capable of receiving the new GPS M-Code signal after FY 2017.<br><br>To meet the Navy's mandate, system engineering and requirement development efforts must begin before actual delivery of Military GPS User Equipment (MGUE). The integration timeline of modernized GPS receivers is 5+ years from planning to test and is dependent on platform type. Each platform uses a unique GPS receiver, and has a unique GPS system configuration, which requires separate parallel efforts to include software updates to avionics and mission computers as well as modifications to the airframe based on Size, Weight and Power and Cost (SWaP-C) requirements; coordination with each Program Management Air (PMA) organization; management, oversight and support of the effort; and contracting and working with the identified Prime Vendor Integrator for the platform. Project currently consists of seven (7) parallel efforts that integrate four (4) different M-Code GPS receivers into seven (7) different type model series aircraft.<br><br>***FY 2019 Plans:***<br>Continue to fund the Prime Vendor Integration and testing of MAGR2K-M GPS Receivers on three (3) air platforms; F/A-18E/F, MV-22B, and CMV-22B. MAGR2K-M GPS Receivers required minimal enhanced functionality and kept the same aviation form factor as the legacy MAGR2K-S receivers. Due to the developmental complexity of EGI-M GPS Receivers, Prime Vendor Integration and testing of Embedded GPS Inertial - M-Code (EGI-M) GPS Receivers will be delayed in order to incorporate enhanced capabilities as required by the EGI-M System Requirements Document (SRD). Project will support critical risk reduction efforts of EGI-M GPS Receivers for five (5) air platforms: F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J.<br><br>Continue GPS Modernization efforts on three (3) air platforms, F/A-18E/F, MV-22B and CMV-22B, which require MAGR2K-M receivers:<br>- Award Prime Vendor Integration (PVI) contracts for MV-22B and CMV-22B air platforms.<br>- Finalize cybersecurity requirements and Software Statement of Requirements (SOR).<br>- Conduct systems engineering and technical reviews (SETR) including Systems Requirements Review (SRR) and Preliminary Design Review (PDR).<br>- Completed hardware and software M-Code integration risk reduction studies of MAGR2K-M receiver for F/A-18E/F.<br>- Perform Non-recurring Engineering (NRE) efforts and software updates required for the design and testing of Military Code (M-Code) Global Positioning System (GPS) receivers in support of developmental and operational test events. | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver development.<br><br>Continue GPS Modernization efforts on five (5) air platforms, F/A-18E/F, EA-18G, E-2D, CH-53K, and KC-130J, which require Embedded GPS/Inertial Navigation System (INS) (EGI) type of GPS receivers (ANAV, LN-351, H-764):<br>- Procure test article receivers to provide production representative M-Code receivers for laboratory and flight testing.<br>- Conduct hardware and software M-Code integration risk reduction studies to include Systems Requirement Review (SRR), structural analysis, electrical power load analysis, human engineering, product support analysis, and product support review of Engineering & Manufacturing Development (EMD) Contract Data Requirements List (CDRL) deliverables.<br>- Development of requirements and systems engineering efforts for integrating M-Code GPS receivers into the airframe and aircraft software.<br>- Continue process to integrate M-Code capability into platform receiver and to test modernized receiver into platform.<br>- Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver development.<br><br>OCO:<br>N/A.<br><br>***FY 2020 Base Plans:***<br>FY 2020 funding has been realigned to PE 0604280N Project 0921 (NAVSTAR GPS Equipment) as part of PE Consolidation.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program decrease is due to realigning funds as part of PE Consolidation. FY 2020 justification and change explanation is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment). | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 63.519 | 80.675 | 0.000 | 0.000 | 0.000 |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2657: *NAVSTAR GPS Receivers (Space)* | 15.923 | 10.703 | 32.674 | - | 32.674 | 33.721 | 29.977 | 22.938 | 23.394 | Continuing | Continuing |
| • APN/0577: *Common Avionics Changes* | 12.431 | 7.543 | 8.118 | - | 8.118 | 7.991 | 19.193 | 41.139 | 45.712 | 245.777 | 778.432 |

**Remarks**

**D. Acquisition Strategy**

Both the Navigation Warfare (NAVWAR) Air and Sea programs continue to integrate improved anti-jam (AJ) capability onto air and sea platforms and ensure compatibility with new Military Code (M-Code) signal.

Global Positioning System (GPS)-based Positioning, Navigation, and Timing (PNT) Service (GPNTS) program will develop, acquire, and field GPNTS, a scalable Selective Availability/Anti- Spoofing Module (SAASM) GPS-based service-oriented architecture PNT system that will provide an open, extensible, modernized replacement for the current fleet PNT systems. GPNTS will also integrate Military GPS User Equipment (MGUE) and the Office of Naval Research (ONR) developed Non-GPS Aided Positioning for Surface Ships (NoGAPSS) capabilities. A firm fixed price contract was awarded March 2018 to procure Low Rate Initial Production (LRIP) and Full Rate Production (FRP) systems.

GPS Modernization manages the non-recurring engineering required to conduct systems engineering, integration and test of modernized GPS receivers and utilize United States Air Force (USAF) hardware contracts, and Navy air platform integration contracts.

**E. Performance Metrics**

The primary metric used for the Air NAVWAR Program is acceptable system performance in a GPS denied environment which is defined by classified values of jamming to signal ratio (J/S) identified in the Enhanced GPS User Equipment (UE) Operational Requirements Document (ORD) 562-06-00 of 7 June 2000. The performance goal is met if acceptable system performance is achieved in the threshold J/S environment cited in the classified appendix.

The primary metric used for the Sea NAVWAR is acceptable system performance in a GPS denial environment defined by classified values of jamming to J/S identified in the Sea NAVWAR Increment 2 Capabilities Production Document (CPD) (12/2008). The performance goal is met if acceptable system performance is achieved in the threshold J/S environment cited in the CPD.

The primary metric used for the GPNTS is successful completion of the system development as outlined in the GPNTS Technical Requirements Document (TRD).

The primary metric used for the GPS Modernization is successful completion of the system development as outlined in the Project Definition Document (PDD) for GPS Modernization.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air NAVWAR Development Support | WR | NAWC : Pax River, MD | 0.000 | 2.215 | Nov 2017 | 2.000 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.215 | - |
| Air NAVWAR Govt Eng Support | WR | NAWC : Pax River, MD | 0.000 | 2.566 | Dec 2017 | 2.250 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.816 | - |
| Sea NAVWAR Development | C/CPIF | Lockheed : Marion, MA | 9.631 | 2.530 | Oct 2017 | 0.400 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 12.561 | - |
| Sea NAVWAR Development Support | WR | SSC PAC, NUWC : San Diego, Newport | 0.000 | 1.484 | Dec 2017 | 0.800 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 2.284 | - |
| Sea NAVWAR Govt Eng Support | WR | SSC PAC, NUWC : San Diego, Newport | 0.000 | 0.345 | Dec 2017 | 0.283 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.628 | - |
| GPNTS HW / SW Development | C/CPIF | Raytheon : San Diego, CA | 39.188 | 4.340 | Nov 2017 | 6.000 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 49.528 | - |
| GPNTS HW Product Development | C/CPFF | Sechan Electronics : Lititz, PA | 0.000 | 0.660 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.660 | - |
| GPNTS SW / NoGAPSS Development | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 1.800 | Jul 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.800 | - |
| GPNTS Development Support | WR | SSC PAC : San Diego, CA | 0.000 | 2.658 | Dec 2017 | 1.500 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.158 | - |
| GPNTS Govt Eng Support | WR | SSC PAC : San Diego, CA | 0.000 | 4.750 | Dec 2017 | 2.456 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 7.206 | - |
| GPS Mod Development F/ A-18E/F MAGR2K-M | C/CPIF | Boeing : St Louis, MO | 0.000 | 1.780 | Apr 2018 | 2.850 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 4.630 | - |
| GPS Mod Development F/ A-18E/F & EA-18G ANAV | C/CPIF | Boeing : St Louis, MO | 0.000 | 0.502 | Sep 2018 | 0.600 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.102 | - |
| GPS Mod Development E-2D | C/CPIF | Northup Gruman : Pax River, MD | 0.000 | 0.500 | Sep 2018 | 0.900 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.400 | - |
| GPS Mod Development MV-22B,CMV-22B | C/CPIF | Bell Boeing : Amarillo, TX | 0.000 | 0.500 | Sep 2018 | 2.700 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.200 | - |
| GPS Mod Hardware F/ A-18E/F MAGR2K-M | C/FFP | TBD : TBD | 0.000 | 0.000 | | 2.302 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.302 | - |
| GPS Mod Hardware E-2D | C/FFP | TBD : TBD | 0.000 | 0.000 | | 0.450 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.450 | - |
| GPS Mod Hardware CH-53K | C/FFP | TBD : TBD | 0.000 | 0.000 | | 0.450 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.450 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GPS Mod Development Support | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 5.673 | Nov 2017 | 2.500 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 8.173 | - |
| GPS Mod Govt Eng Support | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 3.741 | Nov 2017 | 3.800 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 7.541 | - |
| Product Development | WR | GPS Directorate : Los Angeles, CA | 4.924 | 1.300 | Dec 2017 | 1.700 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 7.924 | - |
| Systems Engineering | WR | Govt, Contractor : San Diego, Newport | 28.476 | 0.700 | Nov 2017 | 0.750 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 29.926 | - |
| Product Development | Various | Various : Various | 97.148 | 8.458 | Oct 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 105.606 | - |
| GPS Mod TBD | TBD | Various : Various | 0.000 | 0.000 | | 19.000 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 19.000 | - |
| | | **Subtotal** | 179.367 | 44.702 | | 55.491 | | 0.000 | | - | | 0.000 | 0.000 | 279.560 | N/A |

**Remarks**

FY 2020 cost data is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment).

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contract Engineering Services | WR | BAH : San Diego, Pax River, China Lake | 0.000 | 1.830 | Nov 2017 | 2.700 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.530 | - |
| Enginering Services | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 1.875 | Nov 2017 | 4.310 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 6.185 | - |
| Integrated Logistics Support | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 1.735 | Dec 2017 | 2.750 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.485 | - |
| Technical Data | WR | Various : Various | 0.401 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.401 | - |
| Support | Various | Various : Various | 56.370 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 56.370 | - |
| | | **Subtotal** | 56.771 | 5.440 | | 9.760 | | 0.000 | | - | | 0.000 | 0.000 | 71.971 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

FY 2020 cost data is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment).

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air NAVWAR Test & Evaluation | WR | NAWC : Pax River | 0.000 | 2.250 | Nov 2017 | 3.946 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 6.196 | - |
| Sea NAVWAR Test & Evaluation | WR | SSC PAC, NUWC : San Diego, Newport | 0.000 | 0.138 | Nov 2017 | 1.372 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.510 | - |
| GPNTS Test & Evaluation | WR | SSC PAC : San Diego | 0.000 | 3.187 | Nov 2017 | 4.000 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 7.187 | - |
| GPS Mod Test & Evaluation | WR | SSC PAC, NAWC : San Diego, Pax River | 0.000 | 0.250 | Nov 2017 | 1.000 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1.250 | - |
| Test & Evaluation | Various | Various : Various | 49.282 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 49.282 | - |
| | | **Subtotal** | 49.282 | 5.825 | | 10.318 | | 0.000 | | - | | 0.000 | 0.000 | 65.425 | N/A |

**Remarks**

FY 2020 cost data is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment).

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPAF | BAH : San Diego, Pax River, China Lake | 0.000 | 7.552 | Nov 2017 | 5.106 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 12.658 | - |
| Management Services | Various | Various : Various | 20.223 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.223 | - |
| | | **Subtotal** | 20.223 | 7.552 | | 5.106 | | 0.000 | | - | | 0.000 | 0.000 | 32.881 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>0921 / *NAVSTAR GPS Equipment* | |

**Management Services ($ in Millions)**

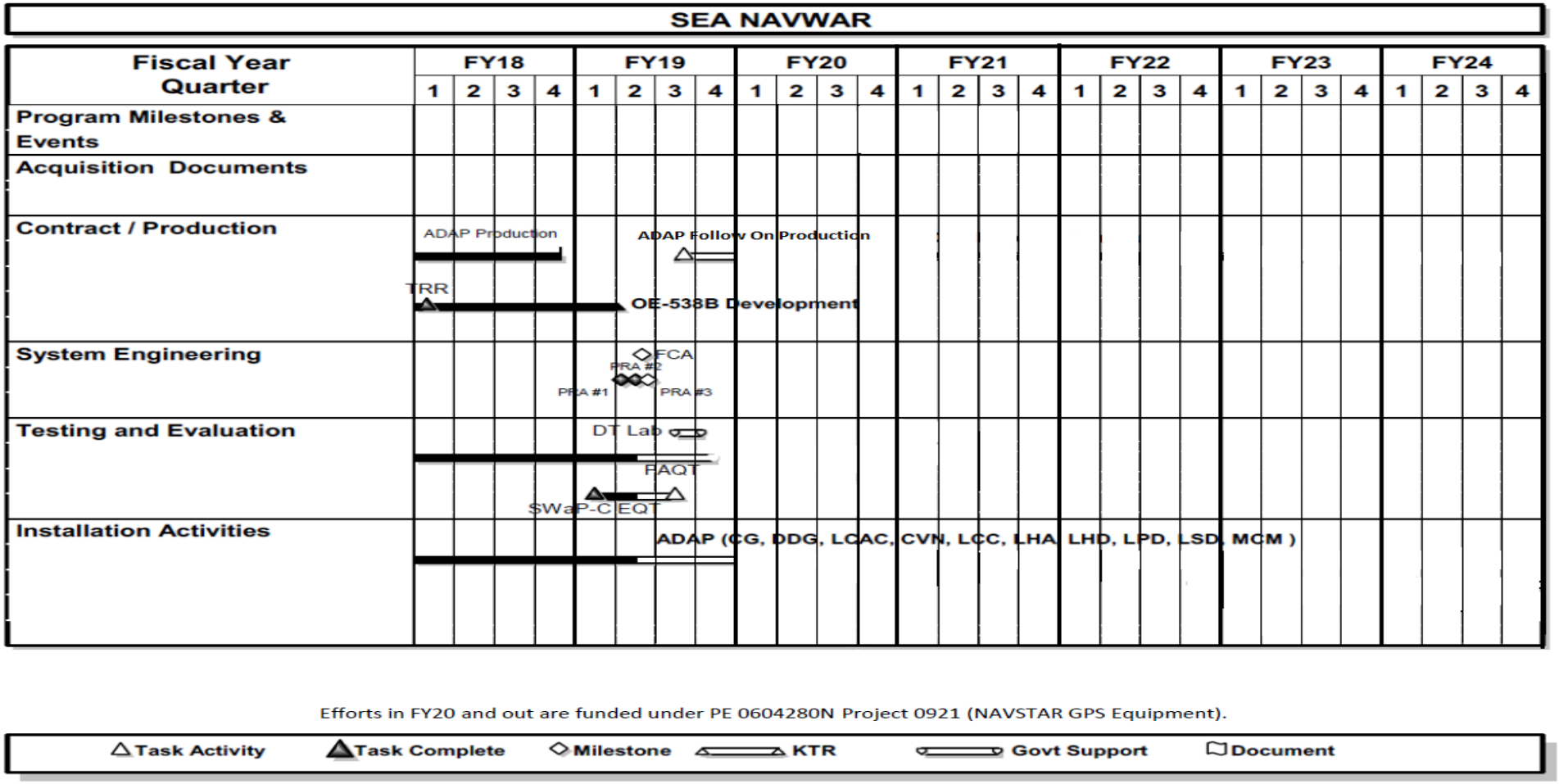
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Remarks** | | | | | | | | | | | | | | | |
| FY 2020 cost data is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment). | | | | | | | | | | | | | | | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 305.643 | 63.519 | | 80.675 | | 0.000 | | - | | 0.000 | 0.000 | 449.837 | N/A |

**Remarks**

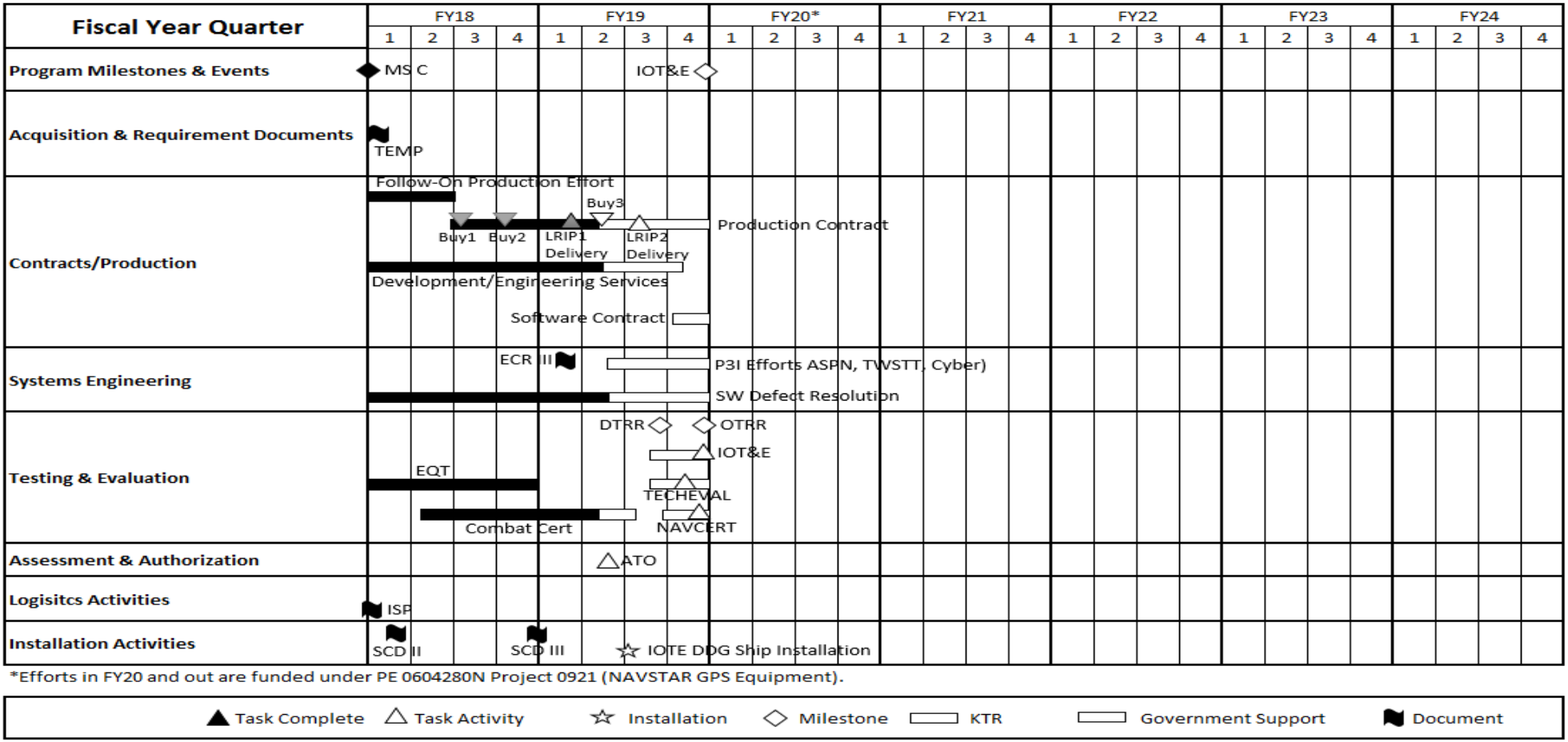
FY 2020 cost data is provided under PE 0604280N Project 0921 (NAVSTAR GPS Equipment).

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |



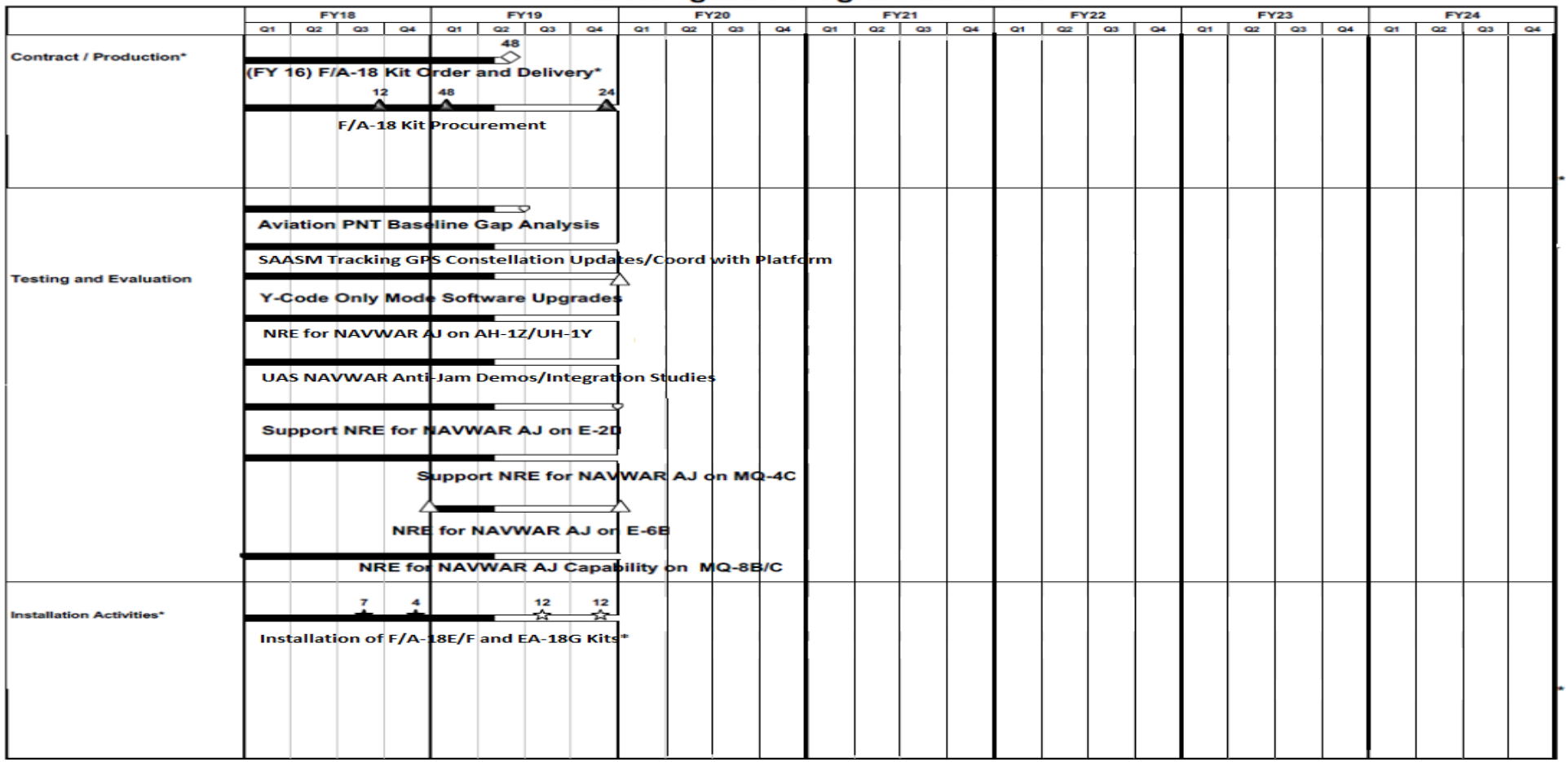
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## GPNTS



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## Air Navigation Program Schedule

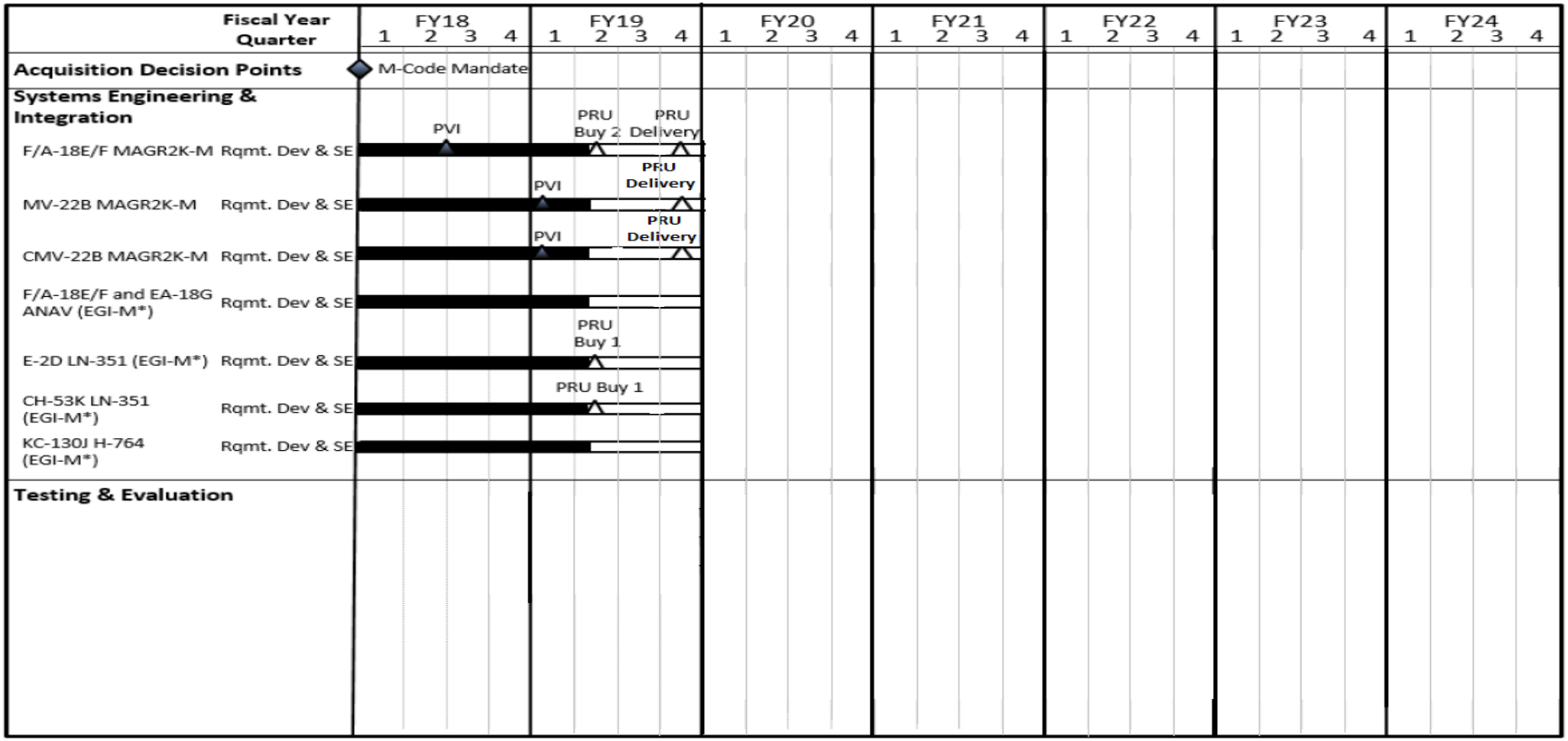



* These Schedule activities are funded with APN

Efforts in FY20 and out are funded under PE 0604280N Project 0921 (NAVSTAR GPS Equipment).

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## GPS Modernization




* EGI-M Platforms will conduct critical Risk Reduction Studies in FY19 and FY20
Efforts in FY20 and out are funded under PE 0604280N Project 0921 (NAVSTAR GPS Equipment).

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0921*** | | | | |
| Sea NAVWAR: Sea Navigation ADAP Production FY18 | 1 | 2018 | 4 | 2018 |
| Sea NAVWAR: Sea Navigation ADAP Follow On Production FY19 | 3 | 2019 | 4 | 2019 |
| Sea NAVWAR: Sea Navigation OE-538B Development | 1 | 2018 | 2 | 2019 |
| Sea NAVWAR: Sea Navigation Test Readiness Review (TRR) | 1 | 2018 | 1 | 2018 |
| Sea NAVWAR: Sea Navigation Functional Configuarion Audit (FCA) | 2 | 2019 | 2 | 2019 |
| Sea NAVWAR: Sea Navigation Production Representative Article (PRA) Delivery 1 | 2 | 2019 | 2 | 2019 |
| Sea NAVWAR: Sea Navigation Production Representative Article (PRA) Delivery 2 | 2 | 2019 | 2 | 2019 |
| Sea NAVWAR: Sea Navigation Production Representative Article (PRA) Delivery 3 | 2 | 2019 | 2 | 2019 |
| Sea NAVWAR: Sea Navigation Development Test (DT) LAB | 3 | 2019 | 4 | 2019 |
| Sea NAVWAR: Sea Navigation First Article Qualification Testing (FAQT) | 1 | 2018 | 4 | 2019 |
| Sea NAVWAR: Sea Navigation SWaP-C Engineering Qualification Testing (EQT) | 1 | 2019 | 3 | 2019 |
| Sea NAVWAR: Sea Navigation ADAP Installations | 1 | 2018 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Milestone C | 1 | 2018 | 1 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Initial Operational Test & Evaluation (IOT&E) | 4 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Test and Evaluation Master Plan (TEMP) | 1 | 2018 | 1 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Follow-On Production Effort | 1 | 2018 | 2 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Production Contract | 3 | 2018 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 1 | 3 | 2018 | 3 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 2 | 4 | 2018 | 4 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Buy 3 | 2 | 2019 | 2 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Development/ Engineering Services | 1 | 2018 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| GPS-based PNT Service (GPNTS): GPNTS Software Contract | 4 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Engineering Change Request (ECR) Phase III | 1 | 2019 | 1 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS P3I Efforts | 2 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS SW Defect Resolution | 1 | 2018 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Development Test Readiness Review (DTRR) | 3 | 2019 | 3 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Operational Test Readiness Review (OTRR) | 4 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Initial Operational Test and Evaluation (IOT&E) | 3 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Environmental Quality Testing (EQT) | 1 | 2018 | 4 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Technical Evaluation | 3 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Combat Certification | 2 | 2018 | 3 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS NAVCERT | 3 | 2019 | 4 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Authority to Operate (ATO) | 2 | 2019 | 2 | 2019 |
| GPS-based PNT Service (GPNTS): GPNTS Initial Security Plan (ISP) | 1 | 2018 | 1 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS Ship Change Document (SCD) II | 1 | 2018 | 1 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS SCD III | 4 | 2018 | 4 | 2018 |
| GPS-based PNT Service (GPNTS): GPNTS DDG Installation for IOT&E | 3 | 2019 | 3 | 2019 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2016 Funds | 1 | 2018 | 2 | 2019 |
| Air NAVWAR: Air Navigation F/A-18 Kit Delivery 2016 Funds | 2 | 2019 | 2 | 2019 |
| Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2018 | 3 | 2018 | 3 | 2018 |
| Air NAVWAR: Air Navigation F/A-18 Kit First Procurement 2019 | 1 | 2019 | 1 | 2019 |
| Air NAVWAR: Air Navigation F/A-18 Kit Second Procurement 2019 | 4 | 2019 | 4 | 2019 |
| Air NAVWAR: Air Navigation Aviation PNT Baseline Gap Analysis | 1 | 2018 | 3 | 2019 |
| Air NAVWAR: Air Navigation SAASM Tracking GPS Constellation Updates | 1 | 2018 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Air NAVWAR: Air Navigation Y-Code Only Mode Software Upgrades | 1 | 2018 | 4 | 2019 |
| Air NAVWAR: Air Navigation NRE Integration for NAVWAR AJ on AH-1 Z/UH-1Y | 1 | 2018 | 4 | 2019 |
| Air NAVWAR: Air Navigation UAS NAVWAR Anti-Jam Demos/Integration Studies | 1 | 2018 | 4 | 2019 |
| Air NAVWAR: Air Navigation Support NRE for NAVWAR AJ on E-2D | 1 | 2018 | 4 | 2019 |
| Air NAVWAR: Air Navigation Support NRE for NAVWAR AJ on MQ-4C | 1 | 2018 | 4 | 2019 |
| Air NAVWAR: Air Navigation Support NRE for NAVWAR AJ on E-6B | 1 | 2019 | 4 | 2019 |
| Air NAVWAR: Air Navigation Support NRE for NAVWAR AJ on MQ-8B/8C | 1 | 2018 | 4 | 2019 |
| Air NAVWAR: Air Navigation Installation of F/A-18E/F & EA-18G Kits | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization M-Code Mandate | 1 | 2018 | 1 | 2018 |
| GPS Modernization: GPS Modernization F/A-18E/F MAGR2K-M Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization F/A-18E/F MAGR2K-M Prime Vendor Integration | 2 | 2018 | 2 | 2018 |
| GPS Modernization: GPS Modernization F/A18-E/F MAGR2K-M PRU Buy 2 | 2 | 2019 | 2 | 2019 |
| GPS Modernization: GPS Modernization F/A-18E/F MAGR2K-M PRU Delivery 1 | 4 | 2019 | 4 | 2019 |
| GPS Modernization: GPS Modernization MV-22B MAGR2K-M Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization MV-22B MAGR2K-M Prime Vendor Integration | 1 | 2019 | 1 | 2019 |
| GPS Modernization: GPS Modernization MV-22B MAGR2K-M PRU Delivery | 4 | 2019 | 4 | 2019 |
| GPS Modernization: GPS Modernization CMV-22B MAGR2K-M Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization CMV-22B MAGR2K-M Prime Vendor Integration | 1 | 2019 | 1 | 2019 |
| GPS Modernization: GPS Modernization CMV-22B MAGR2K-M PRU Delivery | 4 | 2019 | 4 | 2019 |
| GPS Modernization: GPS Modernization F/A18-E/F & EA-18G ANAV Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization E-2D LN-351 Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization E-2D LN-351 PRU Buy 1 | 2 | 2019 | 2 | 2019 |
| GPS Modernization: GPS Modernization CH-53K LN-351 Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |
| GPS Modernization: GPS Modernization CH-53K LN-351 PRU Buy 1 | 2 | 2019 | 2 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>0921 / *NAVSTAR GPS Equipment* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| GPS Modernization: GPS Modernization KC-130J H-764 Rqmt. Dev & SE | 1 | 2018 | 4 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>1253 / *Combat Ident System* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1253: *Combat Ident System* | 185.913 | 1.830 | 1.983 | 1.888 | - | 1.888 | 1.923 | 1.960 | 1.998 | 2.039 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

MARK (MK) XIIA Mode 5 provides improved secure cooperative combat identification via Identification Friend or Foe (IFF). Mode 5 is developed in cooperation with North Atlantic Treaty Organization, with the DoD implementation governed by AIMS 03-1000A, AIMS 03-1000B and USN requirements defined in ORD # 577-06-01. IFF product improvements are designed to be installed through upgrade and deficiency correction studies, which in turn, become engineering changes to IFF interrogators and transponders and their associated cryptographic material.

The Navy MK XIIA Mode 5 program was approved for entry in Systems Development and Demonstration phase in August 2003 and into the Production and Deployment Phase and Low Rate Initial Production in July 2006, and Full Rate Production July 2012. The Navy Mode 5 program achieved Initial Operational Capability (IOC) in 2012 in accordance with the ORD. Mode 5 capable equipment was fielded in USN/USMC platforms in accordance with Joint Requirements Oversight Council Memorandums (047-07, 122-08 and 108-13) in support of Joint Mode 5 IOC in 2014 and is expected to meet Joint Full Operational Capability in FY2020.

RDT&E articles include Mode 5 cryptographic modules and associated hardware and software changes for IFF interrogators and transponders, including, but not limited to: AN/APX-118/123, AN/APX-119, and AN/APX-111 equipment. RDT&E units are required for government and contractor labs to support aircraft and ship integrations, test sites, test aircraft, and unmanned aircraft systems.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Mode 5 prototype hardware, cryptographic module | 0.981 | 0.164 | 0.096 | 0.000 | 0.096 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Develop kits for installation into existing fleet assets including AN/APX-118/123 Common Digital Transponder, and AN/APX-111 Combined Interrogator Transponder or other interrogator/transponder equipment to include small form factors. Repair and correct deficiencies identified during integration and test. Procure IFF interrogators and transponders, including, but not limited to: AN/APX-123, AN/APX-119, AN/APX-111, cryptographic modules and Mode 5 modification kits to support platform integration and testing. Perform platform integration efforts of Mode 5 equipment for various Type/Model/Series aircraft. | | | | | |
| ***FY 2019 Plans:***<br>Begin T&E system integration testing of the Mode 5 capability in the CH-53K aircraft. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>1253 / *Combat Ident System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete T&E efforts testing the functionality of the Mode 5 capability in the CH-53K aircraft.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 is due to CH-53K transitioning to production. | | | | | |
| ***Title:*** Mode 5 Systems Engineering and Integrated Logistics Support (ILS)<br>***Articles:***<br>***Description:*** Performed systems engineering and analysis in support of Mode 5 hardware/software development and engineering change proposals on Identification Friend or Foe (IFF) interrogators and transponders, including but not limited to: AN/APX-123 Common Digital Transponder, AN/APX-119 Transponder, AN/APX-111 Combined Interrogator Transponder, Cryptographic Modules, Mode 5 Engineering Test Equipment, and Mode 5 support equipment.<br>***FY 2019 Plans:***<br>Development of small form factor IFF for unmanned aircraft systems. Support developmental test of Mode 5 capability in CH-53K aircraft.<br>***FY 2020 Base Plans:***<br>Continue development of small form factor IFF for unmanned aircraft systems. Complete developmental test of Mode 5 capability in CH-53K aircraft.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY 2019 to FY 2020 is due to completion of CH-53K development. | 0.300<br>- | 0.799<br>- | 0.757<br>- | 0.000<br>- | 0.757<br>- |
| ***Title:*** Mode 5 Upgrade Developmental Test & Operational Test<br>***Articles:***<br>***Description:*** Perform Mode 5 integrated and operational test phases for AN/APX-123 Common Transponder, AN/APX-119 Transponder, small form factor IFF for unmanned aircraft systems, and AN/APX-111 Combined Interrogator Transponder.<br>***FY 2019 Plans:*** | 0.549<br>- | 1.020<br>- | 1.035<br>- | 0.000<br>- | 1.035<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>1253 / *Combat Ident System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Perform CH-53K flight testing and certification.<br>***FY 2020 Base Plans:***<br>Complete CH-53K flight testing and certification. Begin small form factor testing.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY 2019 to FY 2020 is due to platform integration testing beginning for small form factor. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.830 | 1.983 | 1.888 | 0.000 | 1.888 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2851: *ID Systems* | 21.239 | 22.777 | 26.059 | - | 26.059 | 25.232 | 49.464 | 57.259 | 58.402 | 297.625 | 851.160 |
| • APN/0582: *ID Sys* | 49.443 | 39.196 | 41.437 | - | 41.437 | 35.653 | 13.347 | 9.605 | 9.797 | 0.000 | 511.395 |

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy is to develop Mode 5 Engineering Change Proposals to modernize Mark XII Identification Friend or Foe (IFF) equipment or insert Mode 5 into existing platforms by JROC memorandums (047-07, 122-08 and 108-13). After integration into all Navy Combat Weapons systems platforms, the Navy will transition Cooperative Identification Capability to Mode 5.

**E. Performance Metrics**

Continue Full Rate Production and assist in achieving Joint Full Operational Capability in FY2020. Perform studies and analysis for future road mapping of IFF capability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>1253 / *Combat Ident System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCAD : PAX River, MD | 15.625 | 0.204 | Nov 2017 | 0.092 | Nov 2018 | 0.056 | Nov 2019 | - | | 0.056 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCAD : St Inigoes, MD | 14.802 | 0.051 | Nov 2017 | 0.655 | Nov 2018 | 0.628 | Nov 2019 | - | | 0.628 | Continuing | Continuing | Continuing |
| Primary Hardware Development | Various | Sikorsky : Stratford, CT | 2.795 | 0.981 | Jan 2018 | 0.164 | Jan 2019 | 0.096 | Jan 2020 | - | | 0.096 | 0.164 | 4.200 | 4.200 |
| Prior Year Prod Dev Services costs no longer funded in FYDP | Various | Various : Various | 90.857 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 90.857 | 43.213 |
| | | **Subtotal** | 124.079 | 1.236 | | 0.911 | | 0.780 | | - | | 0.780 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ILS | Various | Various : Various | 5.040 | 0.083 | Nov 2017 | 0.052 | Nov 2018 | 0.073 | Nov 2019 | - | | 0.073 | Continuing | Continuing | Continuing |
| Prior Year Support Services costs no longer funded in FYDP | Various | Various : Various | 2.761 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.761 | 2.761 |
| | | **Subtotal** | 7.801 | 0.083 | | 0.052 | | 0.073 | | - | | 0.073 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental T & E | WR | NAWCAD : PAX River, MD | 29.267 | 0.511 | Nov 2017 | 1.020 | Nov 2018 | 1.035 | Nov 2019 | - | | 1.035 | 7.705 | 39.538 | - |
| Prior Year T&E costs no longer funded in FYDP | Various | Various : Various | 20.370 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.370 | 3.456 |
| | | **Subtotal** | 49.637 | 0.511 | | 1.020 | | 1.035 | | - | | 1.035 | 7.705 | 59.908 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>1253 / *Combat Ident System* | |

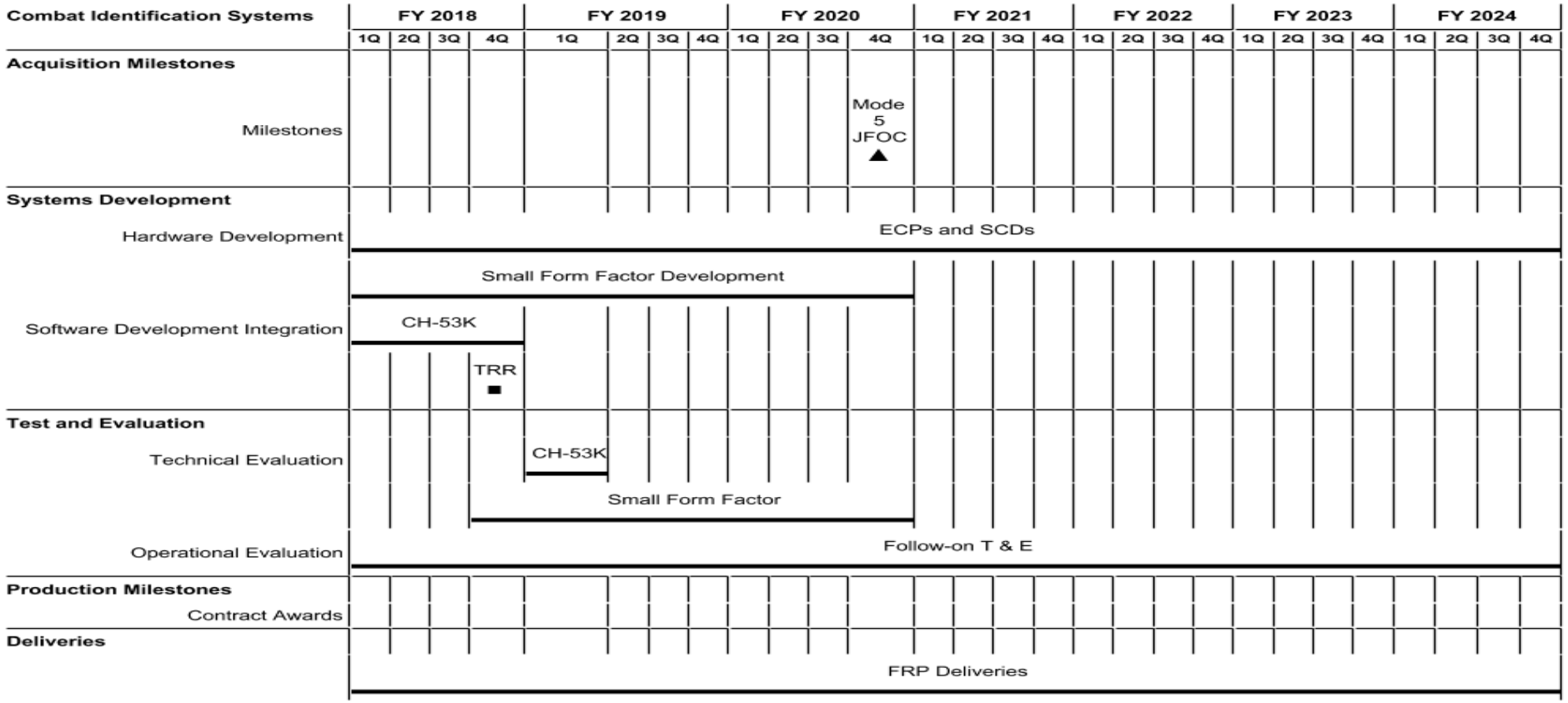
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Year Mgmt Services costs no longer funded in FYDP | Various | Various : Various | 4.396 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.396 | 4.396 |
| | | **Subtotal** | 4.396 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.396 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 185.913 | 1.830 | | 1.983 | | 1.888 | | - | | 1.888 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>1253 / *Combat Ident System* |




*2020PB - 0604777N - 1253*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>1253 / *Combat Ident System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Combat Identification Systems*** | | | | |
| Acquisition Milestones: Milestones: Mode 5 JFOC | 4 | 2020 | 4 | 2020 |
| Systems Development: Hardware Development: Prepare & Evaluate ECPs/SCDs | 1 | 2018 | 4 | 2024 |
| Systems Development: Hardware Development: Small Form Factor | 1 | 2018 | 4 | 2020 |
| Systems Development: Software Development Integration: CH-53K | 1 | 2018 | 4 | 2018 |
| Systems Development: Software Development Integration: Test Readiness Review | 4 | 2018 | 4 | 2018 |
| Test and Evaluation: Technical Evaluation: CH-53K | 1 | 2019 | 1 | 2019 |
| Test and Evaluation: Technical Evaluation: Small Form Factor | 4 | 2018 | 4 | 2020 |
| Test and Evaluation: Operational Evaluation: Follow-on Test and Evaluation | 1 | 2018 | 4 | 2024 |
| Deliveries: FRP Deliveries | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 5.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.000 |
| Quantity of RDT&E Articles | | - | 4 | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

MARK (MK) XIIA Mode 5 provides improved secure cooperative combat identification via Identification Friend or Foe (IFF). Mode 5 is developed in cooperation with North Atlantic Treaty Organization, with the DoD implementation governed by AIMS 03-1000A, AIMS 03-1000B and USN requirements defined in ORD # 577-06-01. Research, development, and acquisition to support a micro IFF transponder with Mode 5 in order to meet the space, weight, and power (SWaP) requirements for Group 2 and 3 Unmanned Aerial Vehicles (UAVs), and other unmanned systems.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Micro-IFF Component | 0.000 | 5.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** Development of prototype, testing and certification of Mode 5 Micro IFF transponder. | | |
| **Congressional Adds Subtotals** | 0.000 | 5.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy is to develop a micro IFF transponder solution through Small Business Innovation Research (SBIR) and other government development organizations.

**E. Performance Metrics**

Achieve NSA Certification.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604777N / *Navigation/Id System* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

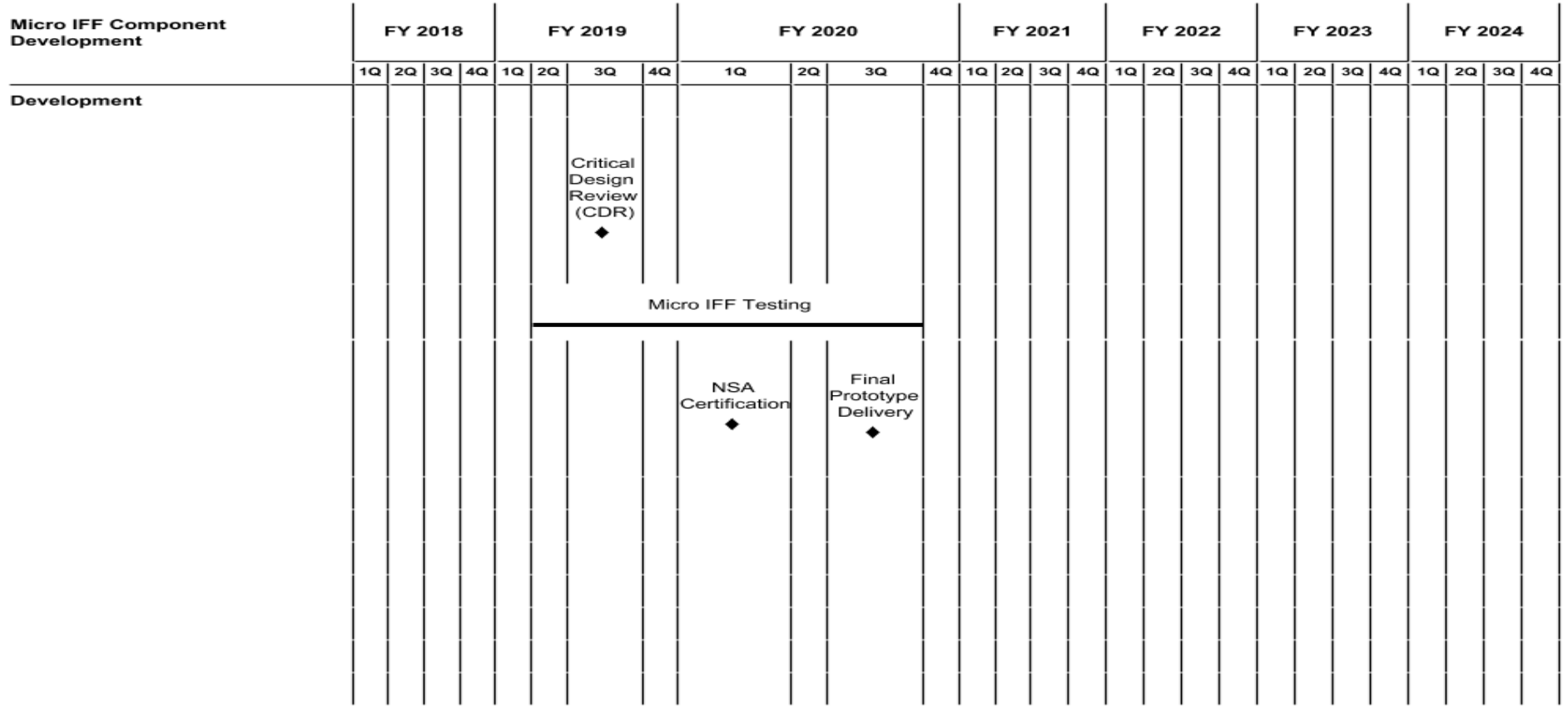
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development - SBIR | Various | R-Cubed Engineering LLC : Palmetto, FL | 0.000 | 0.000 | | 1.994 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.994 | 1.994 |
| Product Development - SBIR | Various | Intelligent Automation : Rockville, MD | 0.000 | 0.000 | | 1.994 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.994 | 1.994 |
| Product Development - Organic | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.700 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.700 | - |
| Certification | TBD | Various : Various | 0.000 | 0.000 | | 0.312 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.312 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 5.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.000 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 5.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0604777N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604777N / *Navigation/Id System* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Micro IFF Component Development*** | | | | |
| Development: NSA Certification Critical Design Review (CDR) | 3 | 2019 | 3 | 2019 |
| Development: Micro IFF Testing | 2 | 2019 | 3 | 2020 |
| Development: Final Prototype Delivery | 3 | 2020 | 3 | 2020 |
| Development: NSA Certification | 1 | 2020 | 1 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604800M *I (U)Joint Strike Fighter (JSF) - EMD* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 50,902.883 | 157.162 | 66.566 | 1.710 | - | 1.710 | 0.540 | 0.556 | 0.567 | 0.578 | 0.000 | 51,130.562 |
| 2262: *Joint Strike Fighter EMD STOVL* | 50,438.576 | 146.202 | 66.566 | 1.710 | - | 1.710 | 0.540 | 0.556 | 0.567 | 0.578 | 0.000 | 50,655.295 |
| 3350: *F-35B Sustainment/ Capability Enhancements* | 464.307 | 10.960 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 475.267 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 198 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USAF, USMC and allies. The three variants are the F-35A conventional takeoff and landing; F-35B short takeoff and vertical landing; and the F-35C Aircraft Carrier suitable variant. The F-35A will be a stealthy multi-role aircraft, primary air-to-ground for the Air Force to replace the F-16 and A-10 and complement the F-22. The F-35B variant will be a multi-role strike fighter aircraft to replace the AV-8B and F/A-18 for the Marine Corps, replace the Sea Harrier and GR 7 for the United Kingdom, and replace the AV-8 currently employed by the Italian Navy. The F-35C will provide the Department of the Navy a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, Norway, and Foreign Military Sales customers are also participants in the JSF program. The program shown here reflects USN, USMC, USAF, and International Partner funding.

Funding at the accomplishment/planned program level is reported as the total of all services and partners as these activities support all aircraft variants.

The System Development and Demonstration (SDD) budget funds a total quantity of 20 RDT&E test articles to include 6 ground test articles and 14 flight test articles for USN, USMC, and USAF use.

FY07: 1 F-35A flight test article
FY08: 1 F-35B flight test article; 1 F-35B ground test article
FY09: 1 F-35B flight test article; 2 F-35A ground test articles
FY10: 6 flight test articles: 3 F-35A, 2 F-35B, 1 F-35C; 3 ground test articles: 1 F-35B, 2 F-35C
FY11: 4 flight test articles: 1 F-35A, 1 F-35B, 2 F-35C
FY13: 1 F-35C flight test article

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SDD because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604800M *I (U)Joint Strike Fighter (JSF) - EMD* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 152.934 | 66.566 | 1.713 | - | 1.713 |
| Current President's Budget | 157.162 | 66.566 | 1.710 | - | 1.710 |
| Total Adjustments | 4.228 | 0.000 | -0.003 | - | -0.003 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 9.929 | 0.000 | | | |
| • SBIR/STTR Transfer | -5.701 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.003 | - | -0.003 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | | | | Project (Number/Name)<br>2262 / *Joint Strike Fighter EMD STOVL* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2262: *Joint Strike Fighter EMD STOVL* | 50,438.576 | 146.202 | 66.566 | 1.710 | - | 1.710 | 0.540 | 0.556 | 0.567 | 0.578 | 0.000 | 50,655.295 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 198

**Note**

Total cost including United States Navy (USN), United States Marine Corps (USMC), International partner contributions and United States Air Force (USAF) funding are: FY18 $537.672M, FY19 $196.104M and FY20 $10.828M R-2 data reflects variant unique funding only.

R-2A(section B)/R-3 displays total combined program (i.e. not Service specific), including International partners.

F-35 EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USAF, USMC and allies. The three variants are the F-35A Conventional Takeoff and Landing; F-35B Short Takeoff and Vertical Landing; and the F-35C Aircraft Carrier suitable variant. The F-35A will be a stealthy multi-role aircraft, primary air-to-ground for the Air Force to replace the F-16 and A-10 and complement the F-22. The F-35B variant will be a multi-role strike fighter aircraft to replace the AV-8B and F/A-18 for the Marine Corps, replace the Sea Harrier and GR 7 for the United Kingdom, and replace the AV-8 currently employed by the Italian Navy. The F-35C will provide the Department of the Navy a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F.

The United Kingdom, other International Partner nations, and Foreign Military Sales customers are also participants in the Joint Strike Fighter program. The program shown here reflects United States Navy (USN), United States Marine Corps, United States Air Force (USAF), and International Partner funding.

The top-line Program Element reflects the unique variant for each Service. Funding at the accomplishment/planned program level is reported as the total of all services and partners as these activities support all aircraft variants.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

The System Development and Demonstration (SDD) budget funds a total quantity of 20 RDT&E test articles to include 6 ground test articles and 14 flight test articles for USN, USMC and USAF use.

FY07: 1 F-35A flight test article
FY08: 1 F-35B flight test article; 1 F-35B ground test article
FY09: 1 F-35B flight test article; 2 F-35A ground test articles
FY10: 6 flight test articles: 3 F-35A, 2 F-35B, 1 F-35C; 3 ground test articles: 1 F-35B, 2 F-35C
FY11: 4 flight test articles: 1 F-35A, 1 F-35B, 2 F-35C
FY13: 1 F-35C flight test article

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** System Development and Demonstration (SDD) | 377.434 | 105.710 | 10.828 | 0.000 | 10.828 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** SDD execution of the Air System (Lockheed Martin) including International Commonality Efforts; includes airframe, vehicle and mission systems, autonomic logistics, systems engineering & test efforts.<br><br>***FY 2019 Plans:***<br>Continue SDD execution of Air System Lockheed Martin, including International Commonality Effort which includes, airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. Activity aligned to IMS in accordance with variant IOC.<br><br>***FY 2020 Base Plans:***<br>Continue SDD execution of Air System Lockheed Martin, including International Commonality Effort which includes, airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. Activity aligned to IMS in accordance with variant IOC. Conduct SDD closure activities including FCA/PCA in order to establish production specification and transition to post-SDD, production and sustainment.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding decrease is due to reduction in domestic and International controls as SDD phase draws to closure. | | | | | |
| ***Title:*** Systems Engineering (SE) | 0.911 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** SDD SE including systems operations requirements analysis, program integration, requirements integration, and interoperability support.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation (T&E)<br>***Articles:***<br><br>***Description:*** Government DT&E/Operational Testing (OT) in support of first flight of test aircraft. Elements of DT&E includes preparation for flight testing and weapons integration testing.<br><br>***FY 2019 Plans:***<br>Continue government DT&E/OT in support of test aircraft. Continue flight sciences testing of CTOL, STOVL, and CV variants to expand air vehicle envelope and support mission systems testing. Elements of DT&E include flight testing, weapons integration testing, and component capabilities testing.<br><br>***FY 2020 Base Plans:***<br>IOT&E conclusion and reporting requirements.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding decrease is due to reduction in domestic and International controls as SDD phase draws to closure. | 98.035<br>- | 77.826<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Development Support<br>***Articles:***<br><br>***Description:*** SDD Support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. | 20.598<br>- | 12.568<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding decrease is due to reduction in domestic and International controls as SDD phase draws to closure. | | | | | |
| ***Title:*** Autonomic Logistics Information System (ALIS)<br>***Articles:***<br>***Description:*** SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.<br>***FY 2019 Plans:***<br>Continue SDD execution of ALIS to develop the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 40.694<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 537.672 | 196.104 | 10.828 | 0.000 | 10.828 |
| Joint Strike Fighter 0604800F | 263.936 | 69.001 | 7.628 | - | 7.628 |
| Joint Strike Fighter 0604800N | 100.084 | 60.537 | 1.490 | - | 1.490 |
| International Partner | 27.450 | - | - | - | - |
| **Navy Subtotals** | 146.202 | 66.566 | 1.710 | 0.000 | 1.710 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604800F: *F-35A Joint Strike Fighter SDD* | 263.936 | 69.001 | 7.628 | - | 7.628 | 5.434 | 0.013 | 0.000 | 0.000 | 0.000 | 22,334.784 |
| • International: *International Partner (SDD)* | 27.450 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5,013.463 |
| • APAF/0207142F BP10: *F-35A USAF CTOL* | 4,544.684 | 4,253.696 | 4,209.813 | - | 4,209.813 | 4,862.684 | 4,796.042 | 0.000 | 0.000 | 148,685.767 | 202,884.710 |
| • RDT&E/0604800N/2261: *F-35C Joint Strike Fighter (JSF) - EMD* | 100.084 | 60.537 | 1.490 | - | 1.490 | 0.238 | 0.252 | 0.234 | 0.234 | 0.000 | 50,601.645 |
| • APN/0605B: *F-35B Joint Strike Fighter STOVL Spares* | 105.671 | 92.198 | 160.150 | - | 160.150 | 140.989 | 143.809 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0605C: *F-35C Joint Strike Fighter CV Spares* | 84.591 | 44.971 | 52.858 | - | 52.858 | 303.608 | 309.680 | 0.000 | 0.000 | Continuing | Continuing |
| • MILCON 0207142F: *USAF MILCON Operations* | 181.250 | 175.150 | 154.400 | - | 154.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,602.550 |
| • APAF/0207142F BP11: *USAF Modification Funding* | 68.270 | 230.448 | 279.814 | - | 279.814 | 259.978 | 301.899 | 0.000 | 0.000 | 0.000 | 1,665.794 |
| • FOD/0207142F: *USAF Follow-on Development (FoD)* | 299.408 | 396.821 | 504.971 | - | 504.971 | 418.988 | 343.147 | 283.292 | 0.000 | Continuing | Continuing |
| • 0207142F/USAF BP16: *USAF Joint Strike Fighter Initial Spares* | 320.831 | 319.151 | 416.722 | - | 416.722 | 399.361 | 394.654 | 0.000 | 0.000 | 4,175.007 | 7,849.413 |
| • USAF/OPAF 0207142F: *USAF OPAF* | 3.326 | 3.310 | 2.993 | - | 2.993 | 2.463 | 2.507 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0592: *F-35B STOVL Series* | 34.963 | 36.618 | 65.585 | - | 65.585 | 47.545 | 67.429 | 55.402 | 61.693 | Continuing | Continuing |
| • APN/0593: *F-35C CV Series* | 31.689 | 21.236 | 15.358 | - | 15.358 | 12.169 | 13.323 | 13.001 | 13.319 | Continuing | Continuing |
| • RDT&E/0604800N/3352: *F-35C Sustainment/ Capability Enhancements* | 5.564 | 4.957 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 474.828 |
| • USAF SDD BP 653832: *JSF Deployability and Suitability Enhancements* | 18.190 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 222.147 |
| • PAF/0207142F BP10: *F-35A JSF CTOL Advance Procurement* | 780.300 | 405.200 | 1,003.600 | - | 1,003.600 | 965.300 | 414.700 | 0.000 | 0.000 | 20,154.954 | 26,885.296 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2262 / *Joint Strike Fighter EMD STOVL* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • DCA/0207142F 676011: *Dual Capable Aircraft (DCA)* | 35.122 | 78.016 | 71.339 | - | 71.339 | 106.329 | 45.328 | 11.643 | 11.852 | Continuing | Continuing |
| • APN/0147: *F-35C Joint Strike Fighter CV* | 1,434.932 | 2,150.369 | 2,479.012 | - | 2,479.012 | 2,108.140 | 3,568.494 | 3,338.922 | 3,254.095 | 21,184.608 | 55,276.036 |
| • APN/0152C: *F-35B Joint Strike Fighter STOVL AP* | 413.450 | 228.492 | 291.804 | - | 291.804 | 303.035 | 221.554 | 231.317 | 234.344 | 1,855.779 | 5,302.999 |
| • APN/0152: *F-35B Joint Strike Fighter STOVL* | 3,185.195 | 2,850.311 | 1,661.713 | - | 1,661.713 | 1,967.950 | 2,243.672 | 2,705.528 | 2,879.021 | 20,762.973 | 48,897.043 |
| • DoN MILCON: *DoN JSF MILCON* | 64.660 | 121.990 | 119.800 | - | 119.800 | 0.000 | 0.000 | 0.000 | 0.000 | 642.400 | 1,406.074 |
| • International 2: *Intl Production/ Reprogramming Lab* | 124.114 | 151.776 | 150.588 | - | 150.588 | 149.848 | 87.119 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN/4268: *Logistics Information System (ALIS)* | 63.995 | 37.874 | 55.415 | 0.500 | 55.915 | 58.072 | 61.614 | 73.629 | 74.812 | Continuing | Continuing |
| • MC/0207597F: *USAF MILCON Training* | 70.350 | 11.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 166.750 |
| • International 3: *International R&D FoM/D&S* | 158.273 | 159.649 | 162.023 | - | 162.023 | 167.383 | 160.111 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN 902010 S8JC: *Aviation Support Equipment (ALIS)* | 2.297 | 2.321 | 0.139 | - | 0.139 | 1.977 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • USAF O&M: *USAF O&M* | 516.569 | 731.134 | 909.930 | - | 909.930 | 985.790 | 1,089.394 | 0.000 | 0.000 | Continuing | Continuing |
| • USN 2936: *F-35C Follow-on Development (CV)* | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| • International Unique: *Intl Unique (SDD/PSFD)* | 15.566 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 481.617 |
| • APN/0147C: *F-35C Joint Strike Fighter CV AP* | 263.112 | 140.010 | 339.053 | - | 339.053 | 443.786 | 278.323 | 249.135 | 243.615 | 2,304.960 | 5,795.077 |
| • USMC 2935: *F-35C Follow-on Development (STOVL)* | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| • 0604840N F-35C C2D2: *F-35C 3411* | 0.000 | 227.998 | 383.741 | - | 383.741 | 351.536 | 263.066 | 252.898 | 245.204 | 0.000 | 1,724.443 |
| • 0604840M F-35B C2D2: *F-35B 3410* | 0.000 | 234.107 | 422.881 | - | 422.881 | 373.365 | 313.601 | 283.357 | 270.845 | 0.000 | 1,898.156 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

The SDD program consists of a cost-reimbursement contract awarded to Lockheed Martin Aeronautics Company to develop the F-35 Air System, consisting of three aircraft variants and its associated logistics support system, for the U.S. Services and international participants. Similarly, a cost-reimbursement contract was awarded to Pratt & Whitney to develop the F135 propulsion system. Ground and flight testing will be conducted during development to accomplish validation and verification, with the extensive use of modeling and simulation to offset the risk of this large, complex, and concurrent lifecycle program. A comprehensive logistics support environment, including an integrated training system for aircrew, maintenance, and support personnel, is also being developed.

On 25 April 2011, the Department of Defense terminated the development of the General Electric Rolls-Royce Fighter Engine Team F136 propulsion system.

The F-35 Program has made international involvement a key element of the acquisition strategy. This includes international partnership in the development, production, and sustainment phases of the lifecycle. Additional international participation includes Foreign Military Sales arrangements.

In Fiscal Year 2007, separate cost-type contracts were awarded to Lockheed Martin Aeronautics Company and Pratt & Whitney to begin low rate initial production for F-35 air vehicles, propulsion systems, and sustainment for the fielded systems. Transition to fixed-price-type procurement contracts occurred with the fourth low rate lot. To provide logistics support for delivered aircraft, Performance-Based Logistics cost-type contracts will be awarded to Lockheed Martin Aeronautics Company and Pratt & Whitney.

At the completion of Low Rate Initial Production, a Defense Acquisition Board review, and Milestone Decision Authority approval, the F-35 Program will enter Full Rate Production. Fixed-price procurement contracts will be awarded for F-35 air vehicles and propulsion systems for the U.S. Services and international participants. Multiyear procurement authority for the F-35 Air System will be requested for Full Rate Production. Concurrently, a fixed-price-type Performance Based Logistics contracts for sustainment will be requested to support multi-Service and multi-national requirements.

**E. Performance Metrics**

The following are the key performance parameters from the F-35 Selected Acquisition Report:

Performance Metrics reflect Key Program Performance data.

Combat Radius
F-35A Meets/Exceeds Tripwire Requirement
F-35B Meets/Exceeds Tripwire Requirement

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

F-35C Meets/Exceeds Tripwire Requirement

CV Recovery Performance
Maximum Approach Speed at required carrier landing weight

Mission Reliability
F-35A Meets/Exceeds Tripwire Requirement
F-35B Meets/Exceeds Tripwire Requirement
F-35C Meets/Exceeds Tripwire Requirement

Sortie Generation Rate
F-35A Meets Tripwire Requirement
F-35B Meets Tripwire Requirement
F-35C Meets Tripwire Requirement

Logistics Footprint
F-35A Less than or equal to 8 C-17 equivalents
F-35B Less than or equal to 8 C-17 equivalents
F-35C Less than or equal to 38,800 cu ft., 217 ST

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2262 / *Joint Strike Fighter EMD STOVL* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - SDD | C/CPIF | Lockheed Martin : Ft. Worth, TX | 32,030.502 | 348.078 | Dec 2017 | 96.560 | Dec 2018 | 10.828 | Dec 2019 | - | | 10.828 | 9.182 | 32,495.150 | 32,495.150 |
| Primary Hardware Development - Award Fee | C/CPIF | Lockheed Martin : Ft. Worth, TX | 1,738.689 | 6.354 | Dec 2017 | 9.150 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1,754.193 | 1,754.193 |
| Primary Hardware Development - ALIS | C/CPIF | Lockheed Martin : Ft. Worth, TX | 462.538 | 40.694 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 503.232 | 503.232 |
| Primary Hardware Development - 0031 | C/CPFF | Lockheed Martin : Ft. Worth, TX | 0.843 | 0.169 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.012 | 1.012 |
| Primary Hardware Development - 0020 | C/CPFF | Lockheed Martin : Ft. Worth, TX | 221.119 | 9.813 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 230.932 | 230.932 |
| Primary Hardware Development - SDD | C/CPIF | Pratt and Whitney : Hartford, CT | 7,401.776 | 11.220 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7,412.996 | 7,412.996 |
| Primary Hardware Development - Award Fee | C/CPIF | Pratt and Whitney : Hartford, CT | 692.198 | 1.800 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 693.998 | 693.998 |
| Systems Engineering | Various | Various : Various | 458.948 | 0.911 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 459.859 | 459.859 |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 2,909.122 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2,909.122 | 2,909.122 |
| | | **Subtotal** | 45,915.735 | 419.039 | | 105.710 | | 10.828 | | - | | 10.828 | 9.182 | 46,460.494 | N/A |

**Remarks**

Contract type prior to 2013 was CPAF.
Cumulative Award Fee earned in prior years for Lockheed Martin is 97%.
Cumulative Award Fee earned in prior years for Pratt and Whitney is 98%.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support - AFFTC/Eglin | Various | Eglin AFB : Eglin, FL | 140.760 | 0.830 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 141.590 | - |
| Development Support - AFLCMC/AFRL | Various | AFLCMC/AFRL : Various | 78.962 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 78.962 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2262 / *Joint Strike Fighter EMD STOVL* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engine Test and Evaluation Support - AEDC/Fuel | Various | Various : Various | 203.718 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 203.718 | - |
| Development Support - Miscellaneous | Various | Various : Various | 135.872 | 12.855 | Nov 2017 | 12.480 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 161.207 | - |
| Software Development Support | Various | NAWC WD : China Lake, CA | 167.487 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 167.487 | - |
| Development Support | Various | NAWC AD : Patuxent, MD | 547.210 | 6.913 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 554.123 | - |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 77.641 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 77.641 | - |
| | | **Subtotal** | 1,351.650 | 20.598 | | 12.480 | | 0.000 | | - | | 0.000 | 0.000 | 1,384.728 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test and Evaluation | Various | NAWC WD : China Lake, CA | 43.257 | 0.000 | | 0.004 | Nov 2018 | 0.000 | Nov 2019 | - | | 0.000 | 0.000 | 43.261 | - |
| Developmental Test and Evaluation | Various | NAWC AD : Patuxent River, MD | 807.112 | 4.400 | Nov 2017 | 0.051 | Nov 2018 | 0.000 | Nov 2019 | - | | 0.000 | 0.000 | 811.563 | - |
| Developmental Test and Evaluation | Various | Edwards AFB : Edwards AFB, CA | 738.919 | 4.400 | Nov 2017 | 0.045 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 743.364 | - |
| Developmental Test and Evaluation - Other (including Classified PIDs) | Various | Other (incl Classified PIDs) : Various | 271.874 | 2.400 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 274.274 | - |
| Operational Test and Evaluation Support | Various | OT-AFOTEC/ AFFTC : Kirkland AFB, NM/Eglin AFB, FL | 239.981 | 61.610 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 301.591 | - |
| Operational Test and Evaluation Support | Various | OT-JITC/OPTEC : Various | 104.199 | 19.609 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 123.808 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2262 / *Joint Strike Fighter EMD STOVL* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test and Evaluation Support | Various | OT-CHLK : China Lake, CA | 13.911 | 0.000 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.911 | - |
| Operational Test and Evaluation Support | Various | OT-Various : Various | 10.598 | 5.528 | Nov 2017 | 77.726 | Nov 2018 | 0.000 | Oct 2019 | - | | 0.000 | 0.000 | 93.852 | - |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 27.829 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 27.829 | - |
| | | **Subtotal** | 2,257.680 | 97.947 | | 77.826 | | 0.000 | | - | | 0.000 | 0.000 | 2,433.453 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Security System High BOS | C/FP | Mantech : Arlington, VA | 15.882 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.882 | 15.882 |
| AFLCMC Civilian Pay | Various | AFLCMC CIVPAY : Wright Patterson, AFB, OH | 130.581 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 130.581 | - |
| Program Management Support | C/CPFF | Allutiiq : Arlington, VA | 2.405 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.405 | 2.405 |
| Facilities BOSS | Various | Various : Various | 41.785 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.785 | - |
| CIO ODCs | Various | Various : Various | 20.277 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.277 | - |
| Travel | Various | Various : Various | 27.173 | 0.088 | Dec 2017 | 0.088 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 27.349 | - |
| Program Management Support | Various | Jacobs BOSS : Arlington, VA | 75.126 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 75.126 | - |
| OPS - Cost/FM/EV ACT-I | Various | OPS - Cost/FM/EV : Arlington, VA | 5.845 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.845 | - |
| Program Management Support | Various | Andrews AFB : Camp Springs, MD | 0.493 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.493 | - |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 593.944 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 593.944 | - |
| | | **Subtotal** | 913.511 | 0.088 | | 0.088 | | 0.000 | | - | | 0.000 | 0.000 | 913.687 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2262 / *Joint Strike Fighter EMD STOVL* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost Category Subtotals** | 50,438.576 | 537.672 | | 196.104 | | 10.828 | | - | | 10.828 | 9.182 | 51,192.362 | N/A |
| Joint Strike Fighter 0604800F | - | 263.936 | | 69.001 | | 7.628 | | - | | 7.628 | | | - |
| Joint Strike Fighter 0604800N | - | 100.084 | | 60.537 | | 1.490 | | - | | 1.490 | | | - |
| International Partner | - | 27.450 | | - | | - | | - | | - | | | - |
| **Project Cost Totals** | 50,438.576 | 146.202 | | 66.566 | | 1.710 | | - | | 1.710 | 9.182 | 51,192.362 | - |

**Remarks**

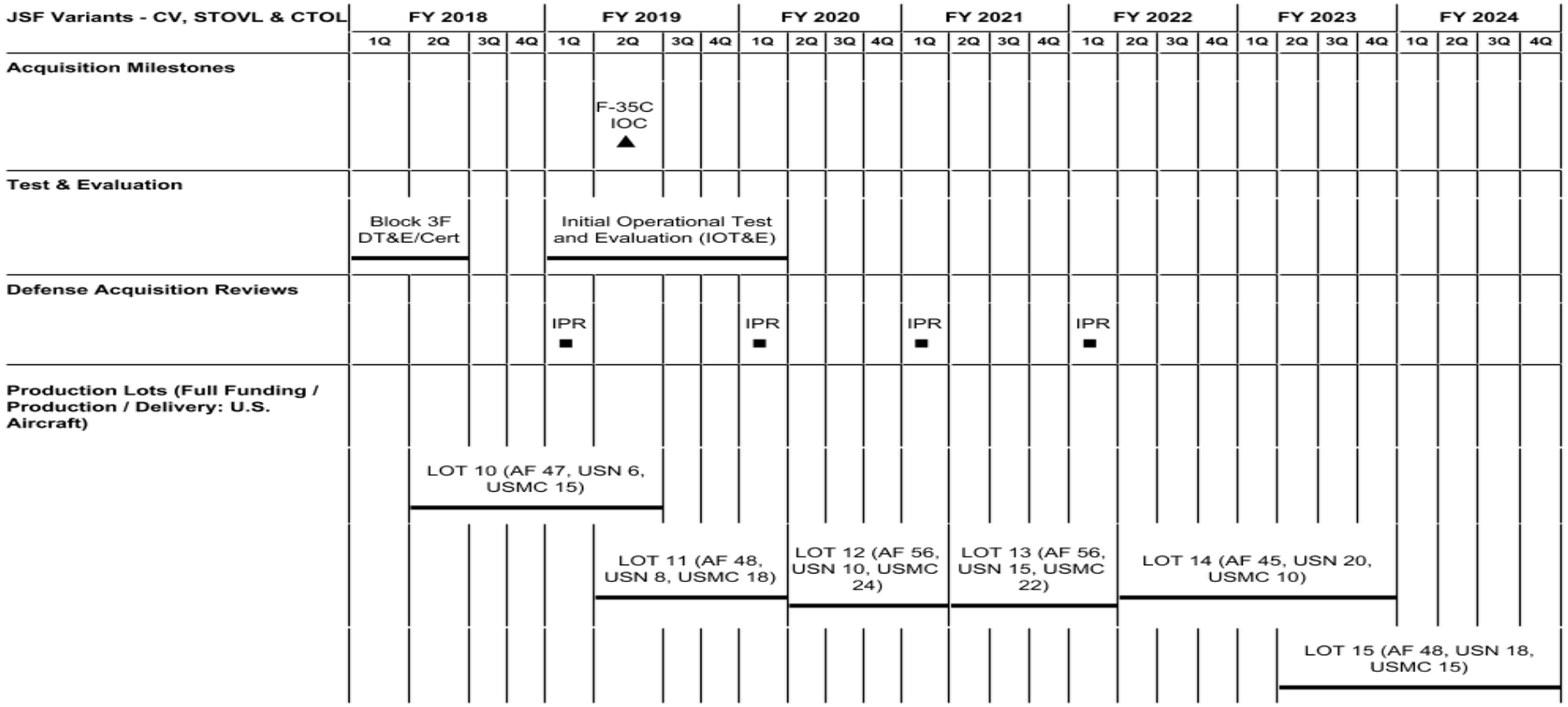
Subtotals and totals may not add due to rounding.

NOTE 1: Prior Years reflect $21,988.772M USAF/$19,801.023M USN/$3,662.768M USMC /$4,986.013 International/Total $50,438.576M
FY 2018 reflects $263.936M USAF/$100.084M USN/$146.202M USMC/$ 27.450M International/Total $537.672M
FY 2019 reflects $ 69.001M USAF/$ 60.537M USN/$ 66.566M USMC/$ 0.000M International/Total $196.104M
FY 2020 reflects $ 7.628M USAF/$ 1.490M USN/$ 1.710M USMC/$ 0.000M International/Total $10.828M

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |




*2020PB - 0604800M - 2262*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2262 / *Joint Strike Fighter EMD STOVL* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JSF Variants - CV, STOVL & CTOL*** | | | | |
| Acquisition Milestones: F-35C Initial Operational Capability | 2 | 2019 | 2 | 2019 |
| Test & Evaluation: Test and Evaluation: Block 3F DT&E/Cert | 1 | 2018 | 2 | 2018 |
| Test & Evaluation: Test and Evaluation: Initial Operational Test and Evaluation (IOT&E) | 1 | 2019 | 1 | 2020 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-18 | 1 | 2019 | 1 | 2019 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-19 | 1 | 2020 | 1 | 2020 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-20 | 1 | 2021 | 1 | 2021 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-21 | 1 | 2022 | 1 | 2022 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 10 Full Funding / Production / Delivery | 2 | 2018 | 2 | 2019 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 11 Full Funding / Production / Delivery | 2 | 2019 | 1 | 2020 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 12 Full Funding / Production / Delivery | 2 | 2020 | 1 | 2021 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 13 Full Funding / Production / Delivery | 2 | 2021 | 1 | 2022 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 14 Full Funding / Production / Delivery | 2 | 2022 | 4 | 2023 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 15 Full Funding / Production / Delivery | 2 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | Date: March 2019 |
|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3350 / *F-35B Sustainment/Capability Enhancements* | | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3350: *F-35B Sustainment/ Capability Enhancements* | 464.307 | 10.960 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 475.267 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 198

**Note**

Total cost including United States Navy (USN), United States Marine Corps (USMC), United States Air Force (USAF) and International Partner contributions funding is: FY18 $41.595M, FY19 $4.957M and FY20 $0.000M

R-2A table shown above reflect service funding only.

R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

D&S Includes:
USAF PE 64800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

**A. Mission Description and Budget Item Justification**

Funds enhancements to the deployability and suitability of the air system such as low observable (LO) maintenance enhancements, security architecture updates, redesign of obsolete items, and integrated training simulators. These enhancements will provide vital on-demand support to the war-fighter within a deployed environment and are not funded via the existing System Development and Demonstration (SDD) program or tied to Block 4 Operational Flight Program development. Funding will result in achieving targeted suitability, maintainability, and affordability returns employing the F-35 in deployed or austere locations.

-Funding at the accomplishment/planned program level is reported as the total of all services as these activities support all aircraft variants. By agreement, USN and USMC funding shares are approximately equal and when combined are equal to the USAF share.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Sustainment and Capability Enhancements | 25.367 | 4.957 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Apply disciplined systems engineering, refinement of requirements, develop and acquire | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| suitability and maintainability of the air system such as decentralized maintenance capabilities, LO maintenance enhancements, security architecture updates, redesign of obsolete items and integrated training simulators.<br><br>***FY 2019 Plans:***<br>Continue to conduct systems engineering, technical maturation, integration and test planning for suitability and deployability enhancements. Continue to perform sustaining engineering, development and test activities necessary to gain capacity, compatibility, and expansion in wiring, power, wing conduits, etc. in support of electronic warfare. This includes funding for suitability enhancements related to Distributed Mission Training (DMT).<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 Sustainment/Capability Enhancements funding decrease is due to reduction in domestic and International controls in cojunction with SDD phase drawing to closure. | | | | | |
| ***Title:*** Development Support | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Development Test and Evaluation | 0.500 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Verification and testing for deployability and suitability enhancements.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Autonomic Logistics Information System<br>***Articles:***<br>***Description:*** SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 14.728<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 41.595 | 4.957 | 0.000 | 0.000 | 0.000 |
| Joint Strike Fighter 0604800N 3352 | 5.564 | 4.957 | - | - | - |
| International Partner | 6.881 | - | - | - | - |
| Joint Strike Fighter 0604800F | 18.190 | - | - | - | - |
| **Navy Subtotals** | 10.960 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3350 / *F-35B Sustainment/Capability Enhancements* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604800F: *F-35A Joint Strike Fighter* | 263.936 | 69.001 | 7.628 | - | 7.628 | 5.434 | 0.013 | 0.000 | 0.000 | 0.000 | 22,334.784 |
| • International: *International Partner (SDD)* | 43.274 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5,029.287 |
| • APAF/0207142F BP10: *F-35A USAF CTOL* | 4,544.684 | 4,253.696 | 4,209.813 | - | 4,209.813 | 4,862.684 | 4,796.042 | 0.000 | 0.000 | 148,685.767 | 202,884.710 |
| • RDT&E/0604800N/2261: *F-35C Joint Strike Fighter (JSF) - EMD* | 100.084 | 60.537 | 1.490 | - | 1.490 | 0.238 | 0.252 | 0.234 | 0.234 | 0.000 | 50,601.645 |
| • APN/0605B: *F-35B Joint Strike Fighter STOVL Spares* | 105.671 | 92.198 | 160.150 | - | 160.150 | 140.989 | 143.809 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0605C: *F-35C Joint Strike Fighter CV Spares* | 84.591 | 44.971 | 52.858 | - | 52.858 | 303.608 | 309.680 | 0.000 | 0.000 | Continuing | Continuing |
| • MILCON 0207142F: *USAF MILCON Operations* | 181.250 | 175.150 | 154.400 | - | 154.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,602.550 |
| • APAF/0207142F BP11: *USAF Modification Funding* | 68.270 | 230.448 | 279.814 | - | 279.814 | 259.978 | 301.899 | 0.000 | 0.000 | 0.000 | 1,665.794 |
| • FOD/0207142F: *USAF Follow-on Development (FoD)* | 299.408 | 396.821 | 504.971 | - | 504.971 | 418.988 | 343.147 | 283.292 | 0.000 | Continuing | Continuing |
| • 0207142F/USAF BP16: *USAF Joint Strike Fighter Initial Spares* | 320.831 | 319.151 | 416.722 | - | 416.722 | 399.361 | 394.654 | 0.000 | 0.000 | 4,175.007 | 7,849.413 |
| • USAF/OPAF 0207142F: *USAF OPAF* | 3.326 | 3.310 | 2.993 | - | 2.993 | 2.463 | 2.507 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0592: *F-35B STOVL Series* | 34.963 | 36.618 | 65.585 | - | 65.585 | 47.545 | 67.429 | 55.402 | 61.693 | Continuing | Continuing |
| • APN/0593: *F-35C CV Series* | 31.689 | 21.236 | 15.358 | - | 15.358 | 12.169 | 13.323 | 13.001 | 13.319 | Continuing | Continuing |
| • RDT&E/0604800N/3352: *F-35C Sustainment/ Capability Enhancements* | 5.564 | 4.957 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 474.828 |
| • USAF SDD BP 653832: *Deployability and Suitability Enhancements* | 18.190 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 222.147 |
| • PAF/0207142F BP10: *F-35A JSF CTOL Advance Procurement* | 780.300 | 405.200 | 1,003.600 | - | 1,003.600 | 965.300 | 414.700 | 0.000 | 0.000 | 20,154.954 | 26,885.296 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3350 / *F-35B Sustainment/Capability Enhancements* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • DCA/0207142F 676011: *Dual Capable Aircraft (DCA)* | 34.145 | 77.434 | 71.339 | - | 71.339 | 106.329 | 45.328 | 11.643 | 11.852 | Continuing | Continuing |
| • APN/0147: *F-35C Joint Strike Fighter CV* | 1,434.932 | 2,150.369 | 2,479.012 | - | 2,479.012 | 2,108.140 | 3,568.494 | 3,338.922 | 3,254.095 | 21,184.608 | 55,276.036 |
| • APN/0152C: *F-35B Joint Strike Fighter STOVL AP* | 413.450 | 228.492 | 291.804 | - | 291.804 | 303.035 | 221.554 | 231.317 | 234.344 | 1,855.779 | 5,302.999 |
| • APN/0152: *F-35B Joint Strike Fighter STOVL* | 3,185.195 | 2,850.311 | 1,661.713 | - | 1,661.713 | 1,967.950 | 2,243.672 | 2,705.528 | 2,879.021 | 20,762.973 | 48,897.043 |
| • DoN MILCON: *DoN JSF MILCON* | 64.660 | 121.990 | 119.800 | - | 119.800 | 0.000 | 0.000 | 0.000 | 0.000 | 642.400 | 1,406.074 |
| • International 2: *International Production/Reprogramming Lab* | 124.114 | 151.776 | 150.588 | - | 150.588 | 149.848 | 87.119 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN/4268: *Logistics Information System (ALIS)* | 63.995 | 37.874 | 55.415 | 0.500 | 55.915 | 58.072 | 61.614 | 73.629 | 74.812 | Continuing | Continuing |
| • MC/0207597F: *USAF MILCON Training* | 70.350 | 11.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 166.750 |
| • International 3: *International R&D FoM/D&S* | 158.273 | 159.649 | 162.023 | - | 162.023 | 167.383 | 160.111 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN 902010 S8JC: *Aviation Support Equipment (ALIS)* | 2.297 | 2.321 | 0.139 | - | 0.139 | 1.977 | 0.000 | 0.000 | 0.000 | 0.000 | 11.291 |
| • USAF O&M: *USAF O&M* | 516.569 | 731.134 | 909.930 | - | 909.930 | 985.790 | 1,089.394 | 0.000 | 0.000 | Continuing | Continuing |
| • USN 2936: *F-35C Follow-on Development (CV)* | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| • International Unique: *Imtl Unique (SDD/PSFD)* | 15.566 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 481.617 |
| • APN/0147C: *F-35C Joint Strike Fighter CV AP* | 263.112 | 140.010 | 339.053 | - | 339.053 | 443.786 | 278.323 | 249.135 | 243.615 | 2,304.960 | 5,795.077 |
| • USMC 2935: *F-35C Follow-on Development (STOVL)* | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| • 0604840N F-35C C2D2: *F-35C 3411* | 0.000 | 227.998 | 383.741 | - | 383.741 | 351.536 | 263.066 | 252.898 | 245.204 | 0.000 | 1,724.443 |
| • 0604840M F-35B C2D2: *F-35B 3410* | 0.000 | 234.107 | 422.881 | - | 422.881 | 373.365 | 313.601 | 283.357 | 270.845 | 0.000 | 1,898.156 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Implement Joint Strike Fighter Joint Executive Steering Board/Configuration Steering Board approved enhancements to existing capabilities through existing contracts using the engineering change proposal process. When appropriate, new cost type contracts may be established.

**E. Performance Metrics**

The following are the key performance parameters from the F-35 Selected Acquisition Report:

Performance Metrics reflect Key Program Performance data.

Combat Radius
F-35A Meets/Exceeds Tripwire Requirement
F-35B Meets/Exceeds Tripwire Requirement
F-35C Meets/Exceeds Tripwire Requirement

F-35B Performance
Flat Deck (High-High-High Profile Fuel) Meets Requirement In Tripwire Band
Ski Jump (High-Medium-Medium-High Profile Fuel) Meets Requirement In Tripwire Band
Vertical Landing Bring Back Meets Requirement In Tripwire Band

F-35C Recovery
Maximum Approach Speed Meets Requirement In Tripwire Band

Interoperability
Net Ready Criteria- Meets Requirement In Tripwire Band

Radio Frequency Signature Meets/Exceeds Tripwire Requirement

Force Protection
CB Pilot Protection (New Key Performance Parameters Per CN3) - Meets/Exceeds Tripwire Requirement

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |

Mission Reliability
F-35A Meets/Exceeds Tripwire Requirement
F-35B United States Marine Corps (USMC) Meets/Exceeds Tripwire Requirement
F-35B United Kingdom (UK) Meets/Exceeds Tripwire Requirement
F-35C Exceeds Operational Requiremets Document Objective

Sortie Generation Rate
F-35A Meets/Exceeds Tripwire Requirement
F-35B USMC Meets/Exceeds Tripwire Requirement
F-35B UK Meets/Exceeds Tripwire Requirement
F-35C Meets/Exceeds Tripwire Requirement

Logistics Footprints
F-35A Meets/Exceeds Tripwire Requirement
F-35B USMC Meets/Exceeds Tripwire Requirement

Logistics Footprint- Volume
F-35B USMC Exceeds ORD Objective
F-35B UK Meets/Exceeds Tripwire Requirement
F-35C Exceeds Operational Requirements Document (ORD) Objective

Logistics Footprint-Weight
F-35B USMC Exceeds ORD Objective
F-35B UK Meets/Exceeds Tripwire Requirement
F-35C Exceeds ORD Objective

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3350 / *F-35B Sustainment/Capability Enhancements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - 3002 SDD | C/CPFF | Lockheed Martin : Fort Worth, TX | 89.805 | 22.992 | Mar 2018 | 4.957 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 117.754 | 117.754 |
| Primary Hardware Development - 3002 ALIS | C/CPFF | Lockheed Martin : Fort Worth, TX | 185.146 | 14.728 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 199.874 | 218.886 |
| Primary Hardware Development -14-C-002 Band 2/5 | C/CPFF | Lockheed Martin : Fort Worth, TX | 133.165 | 2.375 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 135.540 | 135.540 |
| | | **Subtotal** | 408.116 | 40.095 | | 4.957 | | 0.000 | | - | | 0.000 | 0.000 | 453.168 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | AFLCMC : Eglin AFB | 33.501 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.501 | - |
| Development Support | Various | Various : Various | 14.778 | 1.000 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.778 | - |
| | | **Subtotal** | 48.279 | 1.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 49.279 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Various : Various | 2.986 | 0.500 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.486 | - |
| | | **Subtotal** | 2.986 | 0.500 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.486 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Support | Various | Various : Various | 4.926 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.926 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Subtotal** | | | 4.926 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.926 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost Category Subtotals** | 464.307 | 41.595 | | 4.957 | | 0.000 | | - | | 0.000 | 0.000 | 510.859 | N/A |
| Joint Strike Fighter 0604800N 3352 | - | 5.564 | | 4.957 | | - | | - | | - | | | - |
| International Partner | - | 6.881 | | - | | - | | - | | - | | | - |
| Joint Strike Fighter 0604800F | - | 18.190 | | - | | - | | - | | - | | | - |
| **Project Cost Totals** | 464.307 | 10.960 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 510.859 | - |

**Remarks**

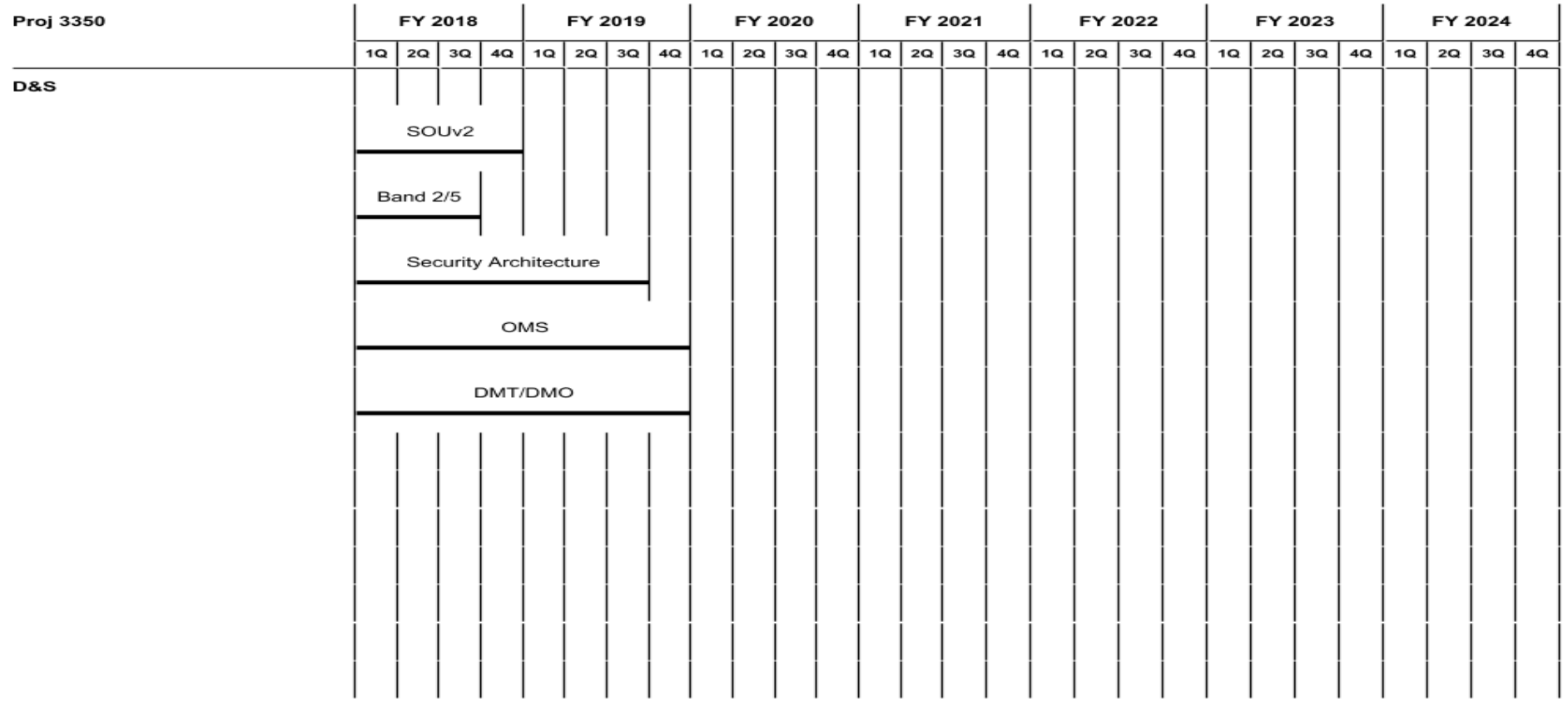
NOTE: Prior Years reflect $201.397M USAF/$92.036M USN/$82.175M USMC/$88.669M International/Total $464.307M
FY 2018 reflects $18.190M USAF/$ 5.564M USN/$10.960M USMC/$ 6.881M International/Total $ 41.595M
FY 2019 reflects $ 0.000M USAF/$ 4.957M USN/$ 0.000M USMC/$ 0.000M International/Total $ 4.957M
FY 2020 reflects $ 0.000M USAF/$ 0.000M USN/$ 0.000M USMC/$ 0.000M International/Total $ 0.000M

R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |




*2020DON - 0604800M - 3350*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800M / *(U)Joint Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3350 / *F-35B Sustainment/Capability Enhancements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3350*** | | | | |
| D&S: Standard Operating Unit (SOUv2) | 1 | 2018 | 4 | 2018 |
| D&S: Band 2/5 | 1 | 2018 | 3 | 2018 |
| D&S: Security Architecture | 1 | 2018 | 3 | 2019 |
| D&S: Offboard Misson Support (OMS) Redesign | 1 | 2018 | 4 | 2019 |
| D&S: Distributed Mission Training/Distributed Mission Operations (DMT/DMO) | 1 | 2018 | 4 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604800N *I JT Strike Fighter (JSF) - EMD* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 50,902.883 | 105.648 | 65.494 | 1.490 | - | 1.490 | 0.238 | 0.252 | 0.234 | 0.234 | 0.000 | 51,076.473 |
| 2261: *Joint Strike Fighter EMD* | 50,438.576 | 100.084 | 60.537 | 1.490 | - | 1.490 | 0.238 | 0.252 | 0.234 | 0.234 | 0.000 | 50,601.645 |
| 3352: *F-35C Sustainment/ Capability Enhancements* | 464.307 | 5.564 | 4.957 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 474.828 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 198 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USAF, USMC and allies. The three variants are the F-35A conventional takeoff and landing; F-35B short takeoff and vertical landing; and the F-35C Aircraft Carrier suitable variant. The F-35A will be a stealthy multi-role aircraft, primary air-to-ground for the Air Force to replace the F-16 and A-10 and complement the F-22. The F-35B variant will be a multi-role strike fighter aircraft to replace the AV-8B and F/A-18 for the Marine Corps, replace the Sea Harrier and GR 7 for the United Kingdom, and replace the AV-8 currently employed by the Italian Navy. The F-35C will provide the Department of the Navy a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, Norway, and Foreign Military Sales customers are also participants in the JSF program. The program shown here reflects USN, USMC, USAF, and International Partner funding.

Funding at the accomplishment/planned program level is reported as the total of all services and partners as these activities support all aircraft variants.

The System Development and Demonstration (SDD) budget funds a total quantity of 20 RDT&E test articles to include 6 ground test articles and 14 flight test articles for USN, USMC, and USAF use.

FY07: 1 F-35A flight test article
FY08: 1 F-35B flight test article; 1 F-35B ground test article
FY09: 1 F-35B flight test article; 2 F-35A ground test articles
FY10: 6 flight test articles: 3 F-35A, 2 F-35B, 1 F-35C; 3 ground test articles: 1 F-35B, 2 F-35C
FY11: 4 flight test articles: 1 F-35A, 1 F-35B, 2 F-35C
FY13: 1 F-35C flight test article

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SDD because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604800N *I JT Strike Fighter (JSF) - EMD* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 108.931 | 65.494 | 1.499 | - | 1.499 |
| Current President's Budget | 105.648 | 65.494 | 1.490 | - | 1.490 |
| Total Adjustments | -3.283 | 0.000 | -0.009 | - | -0.009 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -3.283 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.006 | - | -0.006 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.003 | - | -0.003 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | | | | Project (Number/Name)<br>2261 / *Joint Strike Fighter EMD* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2261: *Joint Strike Fighter EMD* | 50,438.576 | 100.084 | 60.537 | 1.490 | - | 1.490 | 0.238 | 0.252 | 0.234 | 0.234 | 0.000 | 50,601.645 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 198

**Note**

Total cost including United States Navy (USN), United States Marine Corps (USMC), International partner contributions and United States Air Force (USAF) funding are: FY18 $537.672M, FY19 $196.104M and FY20 $10.828M R-2 data reflects variant unique funding only.

R-2A(section B)/R-3 displays total combined Program (i.e. not Service specific), including International partners.

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USAF, USMC and allies. The three variants are the F-35A conventional takeoff and landing; F-35B short takeoff and vertical landing; and the F-35C Aircraft Carrier suitable variant. The F-35A will be a stealthy multi-role aircraft, primary air-to-ground for the Air Force to replace the F-16 and A-10 and complement the F-22. The F-35B variant will be a multi-role strike fighter aircraft to replace the AV-8B and F/A-18 for the Marine Corps, replace the Sea Harrier and GR 7 for the United Kingdom, and replace the AV-8 currently employed by the Italian Navy. The F-35C will provide the Department of the Navy a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, Norway, and Foreign Military Sales customers are also participants in the JSF program. The program shown here reflects USN, USMC, USAF, and International Partner funding.

The top-line Program Element reflects the unique variant for each Service. Funding at the accomplishment/planned program level is reported as the total of all services and partners as these activities support all aircraft variants.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

The System Development and Demonstration (SDD) budget funds a total quantity of 20 RDT&E test articles to include 6 ground test articles and 14 flight test articles for USN, USAF, and USMC use.

FY07: 1 F-35A flight test article
FY08: 1 F-35B flight test article; 1 F-35B ground test article
FY09: 1 F-35B flight test article; 2 F-35A ground test articles
FY10: 6 flight test articles: 3 F-35A, 2 F-35B, 1 F-35C; 3 ground test articles: 1 F-35B, 2 F-35C
FY11: 4 flight test articles: 1 F-35A, 1 F-35B, 2 F-35C
FY13: 1 F-35C flight test article

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** System Development and Demonstration (SDD) | 377.434 | 105.710 | 10.828 | 0.000 | 10.828 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** SDD execution of the Air System (Lockheed Martin) including International Commonality Efforts; includes airframe, vehicle and mission systems, autonomic logistics, systems engineering & test efforts. | | | | | |
| ***FY 2019 Plans:***<br>Continue SDD execution of Air System Lockheed Martin, including International Commonality Effort which includes, airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. Activity aligned to IMS in accordance with variant IOC. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue SDD execution of Air System Lockheed Martin, including International Commonality Effort which includes, airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. Activity aligned to IMS in accordance with variant IOC. Conduct SDD closure activities including FCA/PCA in order to establish production specification and transition to post-SDD, production and sustainment. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding decrease is due to reduction in domestic and International controls as SDD phase draws to closure. | | | | | |
| ***Title:*** Systems Engineering (SE) | 0.911 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** SDD SE including systems operations requirements analysis, program integration, requirements integration, and interoperability support.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation (T&E)<br>***Articles:***<br><br>***Description:*** Government DT&E/Operational Testing (OT) in support of first flight of test aircraft. Elements of DT&E include preparation for flight testing and weapons integration testing.<br><br>***FY 2019 Plans:***<br>Continue government DT&E/OT in support of test aircraft. Continue flight sciences testing of CTOL, STOVL, and CV variants to expand air vehicle envelope and support mission systems testing. Elements of DT&E include flight testing, weapons integration testing, and component capabilities testing.<br><br>***FY 2020 Base Plans:***<br>IOT&E conclusion and reporting requirements.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding decrease is due to reduction in domestic and International controls as SDD phase draws to closure. | 98.035<br>- | 77.826<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Development Support<br>***Articles:***<br><br>***Description:*** SDD Support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. | 20.598<br>- | 12.568<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 funding decrease is due to reduction in domestic and International controls as SDD phase draws to closure. | | | | | |
| ***Title:*** Autonomic Logistics Information System (ALIS)<br>***Articles:***<br>***Description:*** SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.<br>***FY 2019 Plans:***<br>Continue SDD execution of ALIS to develop the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 40.694<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 537.672 | 196.104 | 10.828 | 0.000 | 10.828 |
| Joint Strike Fighter 0604800F | 263.936 | 69.001 | 7.628 | - | 7.628 |
| Joint Strike Fighter 0604800M | 146.202 | 66.566 | 1.710 | - | 1.710 |
| International Partner | 27.450 | - | - | - | - |
| **Navy Subtotals** | 100.084 | 60.537 | 1.490 | 0.000 | 1.490 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604800F: *F-35A Joint Strike Fighter SDD* | 263.936 | 69.001 | 7.628 | - | 7.628 | 5.434 | 0.013 | 0.000 | 0.000 | 0.000 | 22,334.784 |
| • International: *International Partner (SDD)* | 27.450 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5,013.463 |
| • APAF/0207142F BP10: *F-35A USAF CTOL* | 4,544.684 | 4,253.696 | 4,209.813 | - | 4,209.813 | 4,862.684 | 4,796.042 | 0.000 | 0.000 | 148,685.767 | 202,884.710 |
| • RDT&E/0604800M/2262: *F-35B JT Strike Fighter (JSF) - EMD* | 146.202 | 66.566 | 1.710 | - | 1.710 | 0.540 | 0.556 | 0.567 | 0.578 | 0.000 | 50,655.295 |
| • APN/0605B: *F-35B Joint Strike Fighter STOVL Spares* | 105.671 | 92.198 | 160.150 | - | 160.150 | 140.989 | 143.809 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0605C: *F-35C Joint Strike Fighter CV Spares* | 84.591 | 44.971 | 52.858 | - | 52.858 | 303.608 | 309.680 | 0.000 | 0.000 | Continuing | Continuing |
| • MILCON 0207142F: *USAF MILCON Operations* | 181.250 | 175.150 | 154.400 | - | 154.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,602.550 |
| • APAF/0207142F BP11: *USAF Modification Funding* | 68.270 | 230.448 | 279.814 | - | 279.814 | 259.978 | 301.899 | 0.000 | 0.000 | 0.000 | 1,665.794 |
| • FOD/0207142F: *USAF Follow-on-Development (FoD)* | 299.408 | 396.821 | 504.971 | - | 504.971 | 418.988 | 343.147 | 283.292 | 0.000 | Continuing | Continuing |
| • 0207142F/USAF BP16: *USAF Joint Strike Fighter Initial Spares* | 320.831 | 319.151 | 416.722 | - | 416.722 | 399.361 | 394.654 | 0.000 | 0.000 | 4,175.007 | 7,849.413 |
| • USAF/OPAF 0207142F: *USAF OPAF* | 3.326 | 3.310 | 2.993 | - | 2.993 | 2.463 | 2.507 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0592: *F-35B STOVL Serious* | 34.963 | 36.618 | 65.585 | - | 65.585 | 47.545 | 67.429 | 55.402 | 61.693 | Continuing | Continuing |
| • APN/0593: *F-35C CV Serious* | 31.689 | 21.236 | 15.358 | - | 15.358 | 12.169 | 13.323 | 13.001 | 13.319 | Continuing | Continuing |
| • RDT&E/0604800M/3350: *F-35B Sustainment/ Capability Enhancements* | 10.960 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 475.267 |
| • USAF SDD BP 653832: *Deployability and Suitability Enhancements* | 18.190 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 222.147 |
| • PAF/0207142F BP10: *F-35A JSF CTOL Advance Procurement* | 780.300 | 405.200 | 1,003.600 | - | 1,003.600 | 965.300 | 414.700 | 0.000 | 0.000 | 20,154.954 | 26,885.296 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2261 / *Joint Strike Fighter EMD* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • DCA/0207142F 676011: *Dual Capable Aircraft (DCA)* | 35.122 | 47.016 | 71.339 | - | 71.339 | 106.329 | 45.328 | 11.643 | 11.852 | Continuing | Continuing |
| • APN/0147: *F-35C Joint Strike Fighter CV* | 1,434.932 | 2,150.369 | 2,479.012 | - | 2,479.012 | 2,108.140 | 3,568.494 | 3,338.922 | 3,254.095 | 21,184.608 | 55,276.036 |
| • APN/0152C: *F-35B Joint Strike Fighter STOVL AP* | 413.450 | 228.492 | 291.804 | - | 291.804 | 303.035 | 221.554 | 231.317 | 234.344 | 1,855.779 | 5,302.999 |
| • APN/0152: *F-35B Joint Strike Fighter STOVL* | 3,185.195 | 2,850.311 | 1,661.713 | - | 1,661.713 | 1,967.950 | 2,243.672 | 2,705.528 | 2,879.021 | 20,762.973 | 48,897.043 |
| • DoN MILCON: *DoN JSF MILCON* | 64.660 | 121.990 | 119.800 | - | 119.800 | 0.000 | 0.000 | 0.000 | 0.000 | 642.400 | 1,406.074 |
| • International 2: *Intl Production/ Reprogramming Lab* | 124.114 | 151.776 | 150.588 | - | 150.588 | 149.848 | 87.119 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN/4268: *Logistics Information System (ALIS)* | 63.995 | 37.874 | 55.415 | 0.500 | 55.915 | 58.072 | 61.614 | 73.629 | 74.812 | Continuing | Continuing |
| • MC/0207597F: *USAF MILCON Training* | 70.350 | 11.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 166.750 |
| • International 3: *International R&D FoM/D&S* | 158.273 | 159.649 | 162.023 | - | 162.023 | 167.383 | 160.111 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN 902010 S8JC: *Aviation Support Equipment (ALIS)* | 2.297 | 2.321 | 0.139 | - | 0.139 | 1.977 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • USAF O&M: *USAF O&M* | 516.569 | 731.134 | 909.930 | - | 909.930 | 985.790 | 1,089.394 | 0.000 | 0.000 | Continuing | Continuing |
| • USN 2936: *F-35C Follow-on Development (CV)* | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| • International Unique: *Intl Unique (SDD/PSFD)* | 15.566 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 481.617 |
| • APN/0147C: *F-35C Joint Strike Fighter CV AP* | 263.112 | 140.010 | 339.053 | - | 339.053 | 443.786 | 278.323 | 249.135 | 243.615 | 2,304.960 | 5,795.077 |
| • USMC 2935: *F-35C Follow-on Development (STOVL)* | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| • 0604840N F-35C C2D2: *F-35C 3411* | 0.000 | 227.998 | 383.741 | - | 383.741 | 351.536 | 263.066 | 252.898 | 245.204 | 0.000 | 1,724.443 |
| • 0604840M F-35B C2D2: *F-35B 3410* | 0.000 | 234.107 | 422.881 | - | 422.881 | 373.365 | 313.601 | 283.357 | 270.845 | 0.000 | 1,898.156 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

The SDD program consists of a cost-reimbursement contract awarded to Lockheed Martin Aeronautics Company to develop the F-35 Air System, consisting of three aircraft variants and its associated logistics support system, for the U.S. Services and international participants. Similarly, a cost-reimbursement contract was awarded to Pratt & Whitney to develop the F135 propulsion system. Ground and flight testing will be conducted during development to accomplish validation and verification, with the extensive use of modeling and simulation to offset the risk of this large, complex, and concurrent lifecycle program. A comprehensive logistics support environment, including an integrated training system for aircrew, maintenance, and support personnel, is also being developed.

On 25 April 2011, the Department of Defense terminated the development of the General Electric Rolls-Royce Fighter Engine Team F136 propulsion system.

The F-35 Program has made international involvement a key element of the acquisition strategy. This includes international partnership in the development, production, and sustainment phases of the lifecycle. Additional international participation includes Foreign Military Sales arrangements.

In Fiscal Year 2007, separate cost-type contracts were awarded to Lockheed Martin Aeronautics Company and Pratt & Whitney to begin low rate initial production for F-35 air vehicles, propulsion systems, and sustainment for the fielded systems. Transition to fixed-price-type procurement contracts occurred with the fourth low rate lot. To provide logistics support for delivered aircraft, Performance-Based Logistics cost-type contracts will be awarded to Lockheed Martin Aeronautics Company and Pratt & Whitney.

At the completion of Low Rate Initial Production, a Defense Acquisition Board review, and Milestone Decision Authority approval, the F-35 Program will enter Full Rate Production. Fixed-price procurement contracts will be awarded for F-35 air vehicles and propulsion systems for the U.S. Services and international participants. Multiyear procurement authority for the F-35 Air System will be requested for Full Rate Production. Concurrently, a fixed-price-type Performance Based Logistics contracts for sustainment will be requested to support multi-Service and multi-national requirements.

**E. Performance Metrics**

The following are the key performance parameters from the F-35 Selected Acquisition Report:

Performance Metrics reflect Key Program Performance data.

Combat Radius
F-35A Meets/Exceeds Tripwire Requirement
F-35B Meets/Exceeds Tripwire Requirement

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

F-35C Meets/Exceeds Tripwire Requirement

CV Recovery Performance
Maximum Approach Speed at required carrier landing weight

Mission Reliability
F-35A Meets/Exceeds Tripwire Requirement
F-35B Meets/Exceeds Tripwire Requirement
F-35C Meets/Exceeds Tripwire Requirement

Sortie Generation Rate
F-35A Meets Tripwire Requirement
F-35B Meets Tripwire Requirement
F-35C Meets Tripwire Requirement

Logistics Footprint
F-35A Less than or equal to 8 C-17 equivalents
F-35B Less than or equal to 8 C-17 equivalents
F-35C Less than or equal to 38,800 cu ft., 217 ST

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2261 / *Joint Strike Fighter EMD* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - SDD | C/CPIF | Lockheed Martin : Ft. Worth, TX | 32,030.502 | 348.078 | Dec 2017 | 96.560 | Dec 2018 | 10.828 | Dec 2019 | - | | 10.828 | 9.182 | 32,495.150 | 32,495.150 |
| Primary Hardware Development - Award Fee | C/CPIF | Lockheed Martin : Ft. Worth, TX | 1,738.689 | 6.354 | Dec 2017 | 9.150 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 1,754.193 | 1,754.193 |
| Primary Hardware Development - ALIS | C/CPIF | Lockheed Martin : Ft. Worth, TX | 462.538 | 40.694 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 503.232 | 503.232 |
| Primary Hardware Development - 0031 | C/CPFF | Lockheed Martin : Ft. Worth, TX | 0.843 | 0.169 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.012 | 1.012 |
| Primary Hardware Development - 0020 | C/CPFF | Lockheed Martin : Ft. Worth, TX | 221.119 | 9.813 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 230.932 | 230.932 |
| Primary Hardware Development - SDD | C/CPIF | Pratt and Whitney : Hartford, CT | 7,401.776 | 11.220 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7,412.996 | 7,412.996 |
| Primary Hardware Development - Award Fee | C/CPIF | Pratt and Whitney : Hartford, CT | 692.198 | 1.800 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 693.998 | 693.998 |
| Systems Engineering | Various | Various : Various | 458.948 | 0.911 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 459.859 | 459.859 |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 2,909.122 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2,909.122 | 2,909.122 |
| | | **Subtotal** | 45,915.735 | 419.039 | | 105.710 | | 10.828 | | - | | 10.828 | 9.182 | 46,460.494 | N/A |

**Remarks**

Contract type prior to 2013 was CPAF.
Cumulative Award Fee earned in prior years for Lockheed Martin is 97%.
Cumulative Award Fee earned in prior years for Pratt and Whitney is 98%.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support - AFFTC/Eglin | Various | Eglin AFB : Eglin, FL | 140.760 | 0.830 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 141.590 | - |
| Development Support - AFLCMC/AFRL | Various | AFLCMC/AFRL : Various | 78.962 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 78.962 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2261 / *Joint Strike Fighter EMD* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engine Test and Evaluation Support - AEDC/Fuel | Various | Various : Various | 203.718 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 203.718 | - |
| Development Support - Miscellaneous | Various | Various : Various | 135.872 | 12.855 | Nov 2017 | 12.480 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 161.207 | - |
| Software Development Support | Various | NAWC WD : China Lake, CA | 167.487 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 167.487 | - |
| Development Support | Various | NAWC AD : Patuxent River, MD | 547.210 | 6.913 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 554.123 | - |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 77.641 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 77.641 | - |
| | | **Subtotal** | 1,351.650 | 20.598 | | 12.480 | | 0.000 | | - | | 0.000 | 0.000 | 1,384.728 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test and Evaluation | Various | NAWC WD : China Lake, CA | 43.257 | 0.000 | | 0.004 | Nov 2018 | 0.000 | Nov 2019 | - | | 0.000 | 0.000 | 43.261 | - |
| Developmental Test and Evaluation | Various | NAWC AD : Patuxent River, MD | 807.112 | 4.400 | Nov 2017 | 0.051 | Nov 2018 | 0.000 | Nov 2019 | - | | 0.000 | 0.000 | 811.563 | - |
| Developmental Test and Evaluation | Various | Edwards AFB : Edwards AFB, CA | 738.919 | 4.400 | Nov 2017 | 0.045 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 743.364 | - |
| Developmental Test and Evaluation - Other (including Classified PIDs) | Various | Other (incl Classified PIDs) : Various | 271.874 | 2.400 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 274.274 | - |
| Operational Test and Evaluation Support | Various | OT-AFOTEC/ AFFTC : Kirkland AFB, NM/Eglin AFB, FL | 239.981 | 61.610 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 301.591 | - |
| Operational Test and Evaluation Support | Various | OT-JITC/OPTEC : Various | 104.199 | 19.609 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 123.808 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2261 / *Joint Strike Fighter EMD* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operational Test and Evaluation Support | Various | OT-CHLK : China Lake, CA | 13.911 | 0.000 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.911 | - |
| Operational Test and Evaluation Support | Various | OT-Various : Various | 10.598 | 5.528 | Nov 2017 | 77.726 | Nov 2018 | 0.000 | Oct 2019 | - | | 0.000 | 0.000 | 93.852 | - |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 27.829 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 27.829 | - |
| | | **Subtotal** | 2,257.680 | 97.947 | | 77.826 | | 0.000 | | - | | 0.000 | 0.000 | 2,433.453 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Security System High BOS | C/FP | Mantech : Arlington, VA | 15.882 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.882 | 15.882 |
| AFLCMC Civilian Pay | Various | AFLCMC CIVPAY : Wright Patterson, AFB, OH | 130.581 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 130.581 | - |
| Program Management Support | C/CPFF | Allutiiq : Arlington, VA | 2.405 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.405 | 2.405 |
| Facilities BOSS | Various | Various : Various | 41.785 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.785 | - |
| CIO ODCs | Various | Various : Various | 20.277 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.277 | - |
| Travel | Various | Various : Various | 27.173 | 0.088 | Dec 2017 | 0.088 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 27.349 | - |
| Program Management Support | Various | Jacobs BOSS : Arlington, VA | 75.126 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 75.126 | - |
| OPS - Cost/FM/EV ACT-I | Various | OPS - Cost/FM/EV : Arlington, VA | 5.845 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.845 | - |
| Program Management Support | Various | Andrews AFB : Camp Springs, MD | 0.493 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.493 | - |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 593.944 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 593.944 | - |
| | | **Subtotal** | 913.511 | 0.088 | | 0.088 | | 0.000 | | - | | 0.000 | 0.000 | 913.687 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>2261 / *Joint Strike Fighter EMD* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost Category Subtotals** | 50,438.576 | 537.672 | | 196.104 | | 10.828 | | - | | 10.828 | 9.182 | 51,192.362 | N/A |
| Joint Strike Fighter 0604800F | - | 263.936 | | 69.001 | | 7.628 | | - | | 7.628 | | | - |
| Joint Strike Fighter 0604800M | - | 146.202 | | 66.566 | | 1.710 | | - | | 1.710 | | | - |
| International Partner | - | 27.450 | | - | | - | | - | | - | | | - |
| **Project Cost Totals** | 50,438.576 | 100.084 | | 60.537 | | 1.490 | | - | | 1.490 | 9.182 | 51,192.362 | - |

**Remarks**

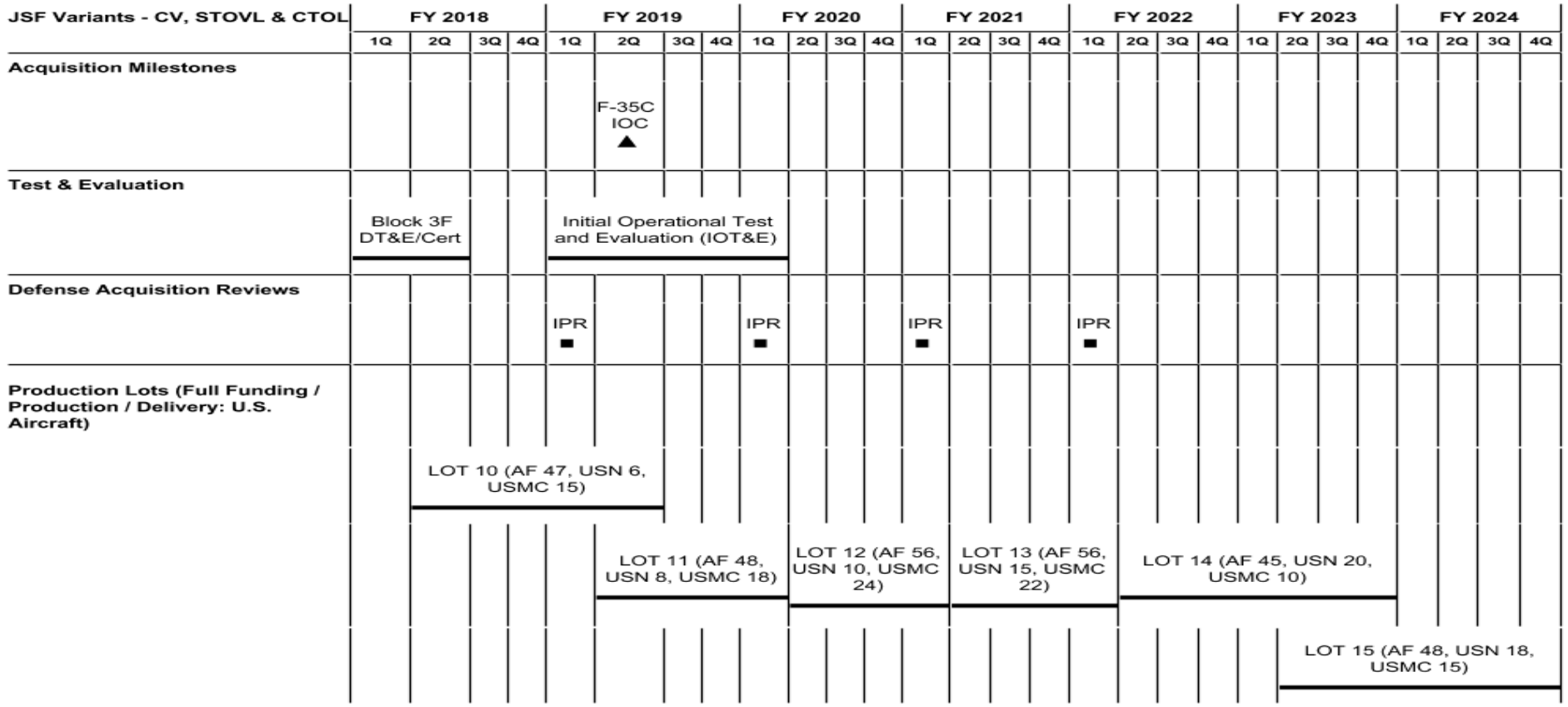
Subtotals and totals may not add due to rounding.

NOTE 1: Prior Years reflect $21,988.772M USAF/$19,801.023M USN/$3,662.768M USMC /$4,986.013 International/Total $50,438.576M
FY 2018 reflects $263.936M USAF/$100.084M USN/$146.202M USMC/$ 27.450M International/Total $537.672M
FY 2019 reflects $ 69.001M USAF/$ 60.537M USN/$ 66.566M USMC/$ 0.000M International/Total $196.104M
FY 2020 reflects $ 7.628M USAF/$ 1.490M USN/$ 1.710M USMC/$ 0.000M International/Total $10.828M

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |




*2020PB - 0604800N - 2261*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>2261 / *Joint Strike Fighter EMD* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JSF Variants - CV, STOVL & CTOL*** | | | | |
| Acquisition Milestones: F-35C Initial Operational Capability | 2 | 2019 | 2 | 2019 |
| Test & Evaluation: Test and Evaluation: Block 3F DT&E/Cert | 1 | 2018 | 2 | 2018 |
| Test & Evaluation: Test and Evaluation: Initial Operational Test and Evaluation (IOT&E) | 1 | 2019 | 1 | 2020 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-18 | 1 | 2019 | 1 | 2019 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-19 | 1 | 2020 | 1 | 2020 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-20 | 1 | 2021 | 1 | 2021 |
| Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY-21 | 1 | 2022 | 1 | 2022 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 10 Full Funding / Production / Delivery | 2 | 2018 | 2 | 2019 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 11 Full Funding / Production / Delivery | 2 | 2019 | 1 | 2020 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 12 Full Funding / Production / Delivery | 2 | 2020 | 1 | 2021 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 13 Full Funding / Production / Delivery | 2 | 2021 | 1 | 2022 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 14 Full Funding / Production / Delivery | 2 | 2022 | 4 | 2023 |
| Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LOT 15 Full Funding / Production / Delivery | 2 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3352 / *F-35C Sustainment/Capability Enhancements* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3352: *F-35C Sustainment/ Capability Enhancements* | 464.307 | 5.564 | 4.957 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 474.828 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 198

**Note**

Total cost including United States Navy (USN), United States Marine Corps (USMC), United States Air Force (USAF) and International Partner contributions funding is: FY18 $41.595M, FY19 $4.957M and FY20 $0.000M

R-2A table shown above reflect service funding only.

R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

D&S Includes:
USAF PE 64800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

**A. Mission Description and Budget Item Justification**

Funds enhancements to the deployability and suitability of the air system such as low observable (LO) maintenance enhancements, security architecture updates, redesign of obsolete items, and integrated training simulators. These enhancements will provide vital on-demand support to the war-fighter within a deployed environment and are not funded via the existing System Development and Demonstration (SDD) program or tied to Block 4 Operational Flight Program development. Funding will result in achieving targeted suitability, maintainability, and affordability returns employing the F-35 in deployed or austere locations.

-Funding at the accomplishment/planned program level is reported as the total of all services as these activities support all aircraft variants. By agreement, USN and USMC funding shares are approximately equal and when combined are equal to the USAF share.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Sustainment and Capability Enhancements | 25.367 | 4.957 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Apply disciplined systems engineering, refinement of requirements, develop and acquire | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| suitability and maintainability of the air system such as decentralized maintenance capabilities, LO maintenance enhancements, security architecture updates, redesign of obsolete items and integrated training simulators.<br><br>***FY 2019 Plans:***<br>Continue to conduct systems engineering, technical maturation, integration and test planning for suitability and deployability enhancements. Continue to perform sustaining engineering, development and test activities necessary to gain capacity, compatibility, and expansion in wiring, power, wing conduits, etc. in support of electronic warfare. This includes funding for suitability enhancements related to Distributed Mission Training (DMT).<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 Sustainment/Capability Enhancements funding decrease is due to reduction in domestic and International controls in cojunction with SDD phase drawing to closure. | | | | | |
| ***Title:*** Development Support<br>***Articles:***<br><br>***Description:*** SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities.<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A | 1.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Development Test and Evaluation<br>***Articles:*** | 0.500<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Verification and testing for deployability and suitability enhancements.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Autonomic Logistics Information System<br>***Articles:***<br>***Description:*** SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 14.728<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 41.595 | 4.957 | 0.000 | 0.000 | 0.000 |
| Joint Strike Fighter 0604800M 3350 | 10.960 | - | - | - | - |
| International Partner | 6.881 | - | - | - | - |
| Joint Strike Fighter 0604800F | 18.190 | - | - | - | - |
| **Navy Subtotals** | 5.564 | 4.957 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3352 / *F-35C Sustainment/Capability Enhancements* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604800F: *F-35A Joint Strike Fighter SDD* | 263.936 | 69.001 | 7.628 | - | 7.628 | 5.434 | 0.013 | 0.000 | 0.000 | 0.000 | 22,334.784 |
| • International: *International Partner (SDD)* | 27.450 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5,013.463 |
| • APAF/0207142F BP10: *F-35A USAF CTOL* | 4,544.684 | 4,253.696 | 4,209.813 | - | 4,209.813 | 4,862.684 | 4,796.042 | 0.000 | 0.000 | 148,685.767 | 202,884.710 |
| • RDT&E/0604800M/2262: *F-35B JT Strike Fighter (JSF) - EMD* | 146.202 | 66.566 | 1.710 | - | 1.710 | 0.540 | 0.556 | 0.567 | 0.578 | 0.000 | 50,655.295 |
| • APN/0605B: *F-35B Joint Strike Fighter STOVL Spares* | 105.671 | 92.198 | 160.150 | - | 160.150 | 140.989 | 143.809 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0605C: *F-35 Joint Strike Fighter CV Spares* | 84.591 | 44.971 | 52.858 | - | 52.858 | 303.608 | 309.680 | 0.000 | 0.000 | Continuing | Continuing |
| • MILCON 0207142F: *USAF MILCON Operations* | 181.250 | 175.150 | 154.400 | - | 154.400 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,602.550 |
| • APAF/0207142F BP11: *USAF Modification Funding* | 68.270 | 230.448 | 279.814 | - | 279.814 | 259.978 | 301.899 | 0.000 | 0.000 | 0.000 | 1,665.794 |
| • FOD/0207142F: *USAF Follow-on-Development (FoD)* | 299.408 | 396.821 | 504.971 | - | 504.971 | 418.988 | 343.147 | 283.292 | 0.000 | Continuing | Continuing |
| • PE/LI0207142F/USAF B: *USAF Joint Strike Fighter Initial Spares* | 320.831 | 319.151 | 416.722 | - | 416.722 | 399.361 | 394.654 | 0.000 | 0.000 | 4,175.007 | 7,849.413 |
| • USAF/OPAF 0207142F: *USAF OPAF* | 3.326 | 3.310 | 2.993 | - | 2.993 | 2.463 | 2.507 | 0.000 | 0.000 | Continuing | Continuing |
| • APN/0592: *F-35B STOVL Serious* | 34.963 | 36.618 | 65.585 | - | 65.585 | 47.545 | 67.429 | 55.402 | 61.693 | Continuing | Continuing |
| • APN/0593: *F-35C CV Serious* | 31.689 | 21.236 | 15.358 | - | 15.358 | 12.169 | 13.323 | 13.001 | 13.319 | Continuing | Continuing |
| • RDT&E/0604800M/3350: *F-35B Sustainment/ Capability Enhancements* | 10.960 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 475.267 |
| • USAF SDD BP 653832: *Deployability and Suitability Enhancements* | 18.190 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 222.147 |
| • PAF/0207142F BP10: *F-35A JSF CTOL Advance Procurement* | 780.300 | 405.200 | 1,003.600 | - | 1,003.600 | 965.300 | 414.700 | 0.000 | 0.000 | 20,154.954 | 26,885.296 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • DCA/0207142F 676011: *Dual Capable Aircraft (DCA)* | 34.145 | 77.434 | 71.339 | - | 71.339 | 106.329 | 45.328 | 11.643 | 11.852 | Continuing | Continuing |
| • APN/0147: *F-35C Joint Strike Fighter CV* | 1,434.932 | 2,150.369 | 2,479.012 | - | 2,479.012 | 2,108.140 | 3,568.494 | 3,338.922 | 3,254.095 | 21,184.608 | 55,276.036 |
| • APN/0152C: *F-35B Joint Strike Fighter STOVL AP* | 413.450 | 228.492 | 291.804 | - | 291.804 | 303.035 | 221.554 | 231.317 | 234.344 | 1,855.779 | 5,302.999 |
| • DoN MILCON: *DoN JSF MILCON* | 64.660 | 121.990 | 119.800 | - | 119.800 | 0.000 | 0.000 | 0.000 | 0.000 | 642.400 | 1,406.074 |
| • International 2: *International Production/Reprogramming Lab* | 124.114 | 151.776 | 150.588 | - | 150.588 | 149.848 | 87.119 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN/4268: *Logistics Information System (ALIS)* | 63.995 | 37.874 | 55.415 | 0.500 | 55.915 | 58.072 | 61.614 | 73.629 | 74.812 | Continuing | Continuing |
| • MC/0207597F: *USAF MILCON Training* | 70.350 | 11.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 166.750 |
| • International 3: *International R&D FoM/D&S* | 158.273 | 159.649 | 162.023 | - | 162.023 | 167.383 | 160.111 | 0.000 | 0.000 | Continuing | Continuing |
| • OPN 902010 S8JC: *Aviation Support Equipment (ALIS).* | 2.297 | 2.321 | 0.139 | - | 0.139 | 1.977 | 0.000 | 0.000 | 0.000 | 0.000 | 11.291 |
| • USAF O&M: *USAF O&M* | 516.569 | 731.134 | 909.930 | - | 909.930 | 985.790 | 1,089.394 | 0.000 | 0.000 | Continuing | Continuing |
| • USN 2936: *F-35C Follow-on Development (CV)* | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| • International Unique: *Intl Unique (SDD/PSFD)* | 15.566 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 481.617 |
| • APN/0147C: *F-35C Joint Strike Fighter CV AP* | 263.112 | 140.010 | 339.053 | - | 339.053 | 443.786 | 278.323 | 249.135 | 243.615 | 2,304.960 | 5,795.077 |
| • USMC 2935: *F-35C Follow-on Development (STOVL)* | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| • 0604840N F-35C C2D2: *F-35C 3411* | 0.000 | 227.998 | 383.741 | - | 383.741 | 351.536 | 263.066 | 252.898 | 245.204 | 0.000 | 1,724.443 |
| • 0604840M F-35B C2D2: *F-35B 3410* | 0.000 | 234.107 | 422.881 | - | 422.881 | 373.365 | 313.601 | 283.357 | 270.845 | 0.000 | 1,898.156 |
| • APN/0152: *F-35B Joint Strike Fighter STOVL* | 3,185.195 | 2,850.311 | 1,661.713 | - | 1,661.713 | 1,967.950 | 2,243.672 | 2,705.528 | 2,879.021 | 20,762.973 | 48,897.043 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

**D. Acquisition Strategy**

Implement Joint Strike Fighter Joint Executive Steering Board/Configuration Steering Board approved enhancements through existing contracts using the engineering change proposal process. When appropriate, new cost type contracts may be established.

**E. Performance Metrics**

The following are the key performance parameters from the F-35 Selected Acquisition Report:

Performance Metrics reflect Key Program Performance data.

Combat Radius
F-35A Meets/Exceeds Tripwire Requirement
F-35B Meets/Exceeds Tripwire Requirement
F-35C Meets/Exceeds Tripwire Requirement

F-35B Performance
Flat Deck (High-High-High Profile Fuel) Meets Requirement In Tripwire Band
Ski Jump (High-Medium-Medium-High Profile Fuel) Meets Requirement In Tripwire Band
Vertical Landing Bring Back Meets Requirement In Tripwire Band

F-35C Recovery
Maximum Approach Speed Meets Requirement In Tripwire Band

Interoperability
Net Ready Criteria- Meets Requirement In Tripwire Band

Radio Frequency Signature Meets/Exceeds Tripwire Requirement

Force Protection
CB Pilot Protection (New Key Performance Parameters Per CN3) - Meets/Exceeds Tripwire Requirement

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |

Mission Reliability
F-35A Meets/Exceeds Tripwire Requirement
F-35B United States Marine Corps (USMC) Meets/Exceeds Tripwire Requirement
F-35B United Kingdom (UK) Meets/Exceeds Tripwire Requirement
F-35C Exceeds Operational Requiremets Document Objective

Sortie Generation Rate
F-35A Meets/Exceeds Tripwire Requirement
F-35B USMC Meets/Exceeds Tripwire Requirement
F-35B UK Meets/Exceeds Tripwire Requirement
F-35C Meets/Exceeds Tripwire Requirement

Logistics Footprints
F-35A Meets/Exceeds Tripwire Requirement
F-35B USMC Meets/Exceeds Tripwire Requirement

Logistics Footprint- Volume
F-35B USMC Exceeds ORD Objective
F-35B UK Meets/Exceeds Tripwire Requirement
F-35C Exceeds Operational Requirements Document (ORD) Objective

Logistics Footprint-Weight
F-35B USMC Exceeds ORD Objective
F-35B UK Meets/Exceeds Tripwire Requirement
F-35C Exceeds ORD Objective

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | Project (Number/Name)<br>3352 / *F-35C Sustainment/Capability Enhancements* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development - 3002 SDD | C/CPFF | Lockheed Martin : Fort Worth, TX | 89.805 | 22.992 | Mar 2018 | 4.957 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 117.754 | 117.754 |
| Primary Hardware Development - 3002 ALIS | C/CPFF | Lockheed Martin : Fort Worth, TX | 185.146 | 14.728 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 199.874 | 199.874 |
| Primary Hardware Development -14-C-002 Band 2/5 | C/CPFF | Lockheed Martin : Fort Worth, TX | 133.165 | 2.375 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 135.540 | 135.540 |
| | | **Subtotal** | 408.116 | 40.095 | | 4.957 | | 0.000 | | - | | 0.000 | 0.000 | 453.168 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | AFLCMC : Eglin AFB | 33.501 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.501 | - |
| Development Support | Various | Various : Various | 14.778 | 1.000 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.778 | - |
| | | **Subtotal** | 48.279 | 1.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 49.279 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Various : Various | 2.986 | 0.500 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.486 | - |
| | | **Subtotal** | 2.986 | 0.500 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.486 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Support | Various | Various : Various | 4.926 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.926 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Subtotal** | | | 4.926 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.926 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost Category Subtotals** | 464.307 | 41.595 | | 4.957 | | 0.000 | | - | | 0.000 | 0.000 | 510.859 | N/A |
| Joint Strike Fighter 0604800M 3350 | - | 10.960 | | - | | - | | - | | - | | | - |
| International Partner | - | 6.881 | | - | | - | | - | | - | | | - |
| Joint Strike Fighter 0604800F | - | 18.190 | | - | | - | | - | | - | | | - |
| **Project Cost Totals** | 464.307 | 5.564 | | 4.957 | | 0.000 | | - | | 0.000 | 0.000 | 510.859 | - |

**Remarks**

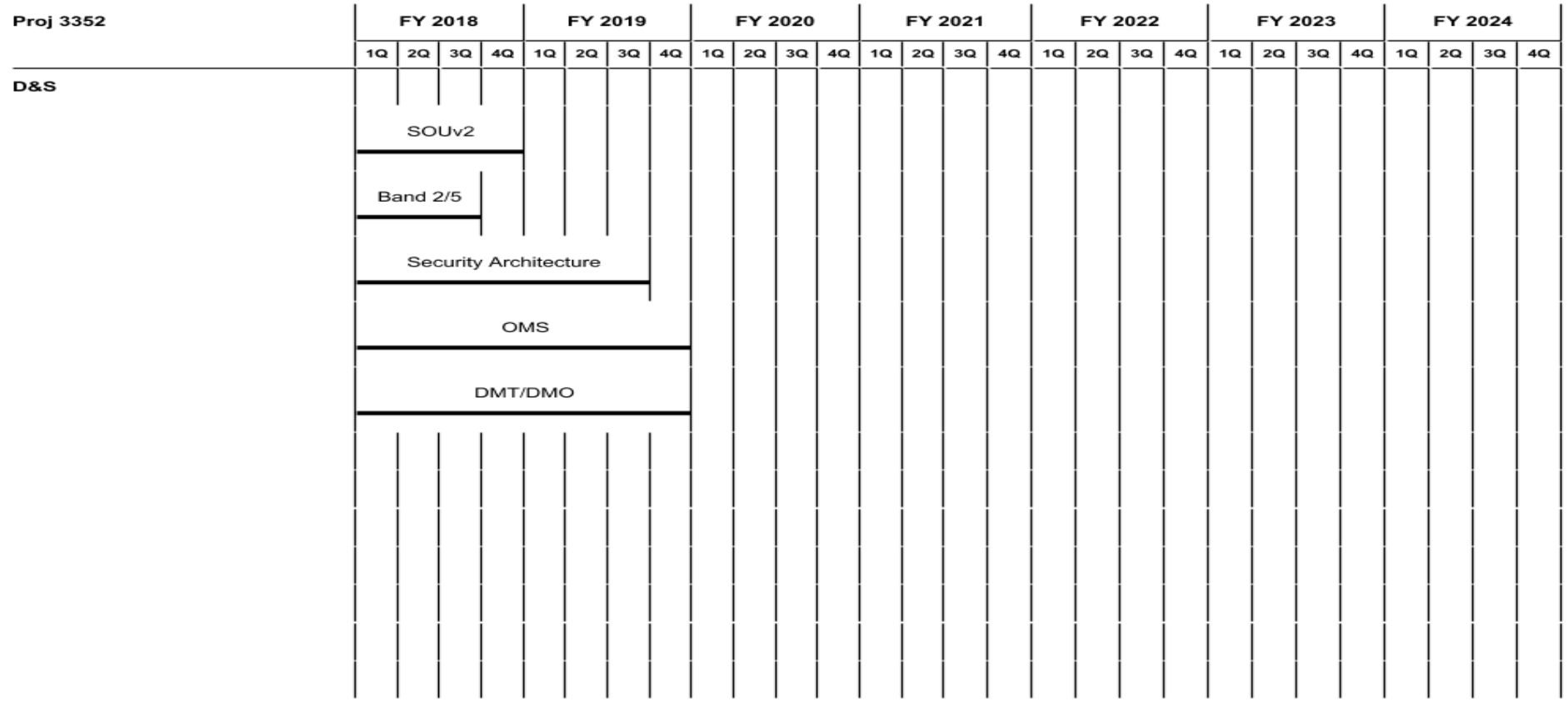
NOTE: Prior Years reflect $201.397M USAF/$92.036M USN/$82.175M USMC/$88.669M International/Total $464.307M
FY 2018 reflects $18.190M USAF/$ 5.564M USN/$10.960M USMC/$ 6.881M International/Total $ 41.595M
FY 2019 reflects $ 0.000M USAF/$ 4.957M USN/$ 0.000M USMC/$ 0.000M International/Total $ 4.957M
FY 2020 reflects $ 0.000M USAF/$ 0.000M USN/$ 0.000M USMC/$ 0.000M International/Total $ 0.000M

R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |




*2020DON - 0604800N - 3352*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604800N / *JT Strike Fighter (JSF) - EMD* | **Project (Number/Name)**<br>3352 / *F-35C Sustainment/Capability Enhancements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3352*** | | | | |
| D&S: Standard Operating Unit (SOUv2) | 1 | 2018 | 4 | 2018 |
| D&S: Band 2/5 | 1 | 2018 | 3 | 2018 |
| D&S: Security Architecture | 1 | 2018 | 3 | 2019 |
| D&S: Offboard Misson Support (OMS) Redesign | 1 | 2018 | 4 | 2019 |
| D&S: Distributed Mission Training/Distributed Mission Operations (DMT/DMO) | 1 | 2018 | 4 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604810M *I (U)Joint Strike Fighter Follow On Mod (FoM) - MC* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 351.791 | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| 2935: *JSF Follow On Modernization - Marine Corps* | 351.791 | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 198 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the United States Navy, United States Air Force, United States Marine Corps and International Partners countries. There are three variants the F-35A Conventional Takeoff and Landing variant; F-35B Short Take Off and Vertical Landing; and the F-35C Aircraft Carrier suitable variant. Maximum commonality among the variants, consistent with National Disclosure Policy, will minimize total air system life cycle costs. Planning and pre-development systems engineering for the Block 4 continues as Initial Operational Capability (IOC) is met for each variant during System Development and Demonstration (SDD).

The JSF Continuous Capability Development and Delivery (C2D2) efforts provide incremental warfighting capability improvements to maintain joint air dominance against evolving threats. C2D2 capability requirements were initiated through ongoing Service-led operational analysis of warfighting gaps identified in the Fifth Generation Fighter Modernization Initial Capabilities Document (ICD), and through F-35 JSF Block 4 Mission Decomposition analysis completed in FY2014. These analyses serve as the basis for the F-35 Block 4 Capabilities Development Document (CDD), staffed through the Air Force Requirements Oversight Council (AFROC) and signed by the USAF Chief of Staff in January 2015. Joint Requirements Oversight Council (JROC) approved the CDD 21 March 2017. Modernization activities in FY2017 and FY2018 include systems engineering, risk reduction, and infrastructure upgrades required to deliver full Air System capabilities to support initial fleet availability of Block 4 upgrades in FY2021.

C2D2 efforts designated as Block 4 include a robust weapons integration portfolio and provide new opportunities for International Partners to assess, integrate, and field unique capabilities based on global sovereign requirements.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark and Norway are participants in F-35 modernization. The program shown here reflects United States Marine Corps funding. Total funding for all Service and International Partners is reported at the accomplishment/planned program level since activities support all aircraft variants. Foreign Military Sales are ongoing separately.

PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0604810M *I (U)Joint Strike Fighter Follow On Mod (FoM) - MC* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 144.958 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 139.369 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -5.589 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -5.589 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

Program Changes:
FY2018 SBIR Reductions as follows: USAF -8.517, USMC -$5.589 & USN -$5.547.
PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07.

Technical: N/A
Schedule: N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | Project (Number/Name)<br>2935 / *JSF Follow On Modernization - Marine Corps* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2935: *JSF Follow On Modernization - Marine Corps* | 351.791 | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 491.160 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 198

**Note**

Total cost, including International partner contributions, USN, USMC, and USAF funding: FY2018 $725.610M; FY2019 continues in PE 0604840M/N as budget moves from BA05 to BA07.

R-2A table shown above reflects service funding only.

R-2A (section B)/R-3 displays combined program for JSF Continuous Capability Development and Delivery (C2D2).

JSF C2D2 Includes:
USAF PE 0207142F BPAC 675346
USN PE 0604810N/ Project Unit 2936
USMC PE 0604810M Project Unit 2935
USN PE 0604800N Project Unit 9999 (FY14): $1.500M
USMC PE 0604800M Project Unit 9999 (FY14): $1.500M
International Partner Contributions

**A. Mission Description and Budget Item Justification**

F-35 C2D2 provides continuing incremental upgrades of the three F-35 variants and associated ground equipment. Upgrades are essential capabilities for Air Interdiction and Strategic Attack, Close Air Support, Suppression and Destruction of Enemy Air Defenses, Offensive and Defensive Counter Air and expanded Surface Warfare. The C2D2 acquisition strategy is based upon incremental deliveries of capabilities. The strategy includes periodic deliveries with a focus on hardware, tech refresh and softwre. C2D2 capability planning includes an efficient transition from F-35 SDD to C2D2. As SDD development activities ramp down C2D2 will assume responsibility for improvements and modernization efforts.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development - Block 4 Planning and Systems Engineering | 197.314 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Block 4 Planning and Systems Engineering preliminarily design and delta System Requirements Review (SRR) for all variants of the F-35 Aircraft. Modernization efforts is the Requirements Decomposition of capabilities for the entire Block 4 upgrade to include sub-blocks 4.1 and 4.2. This is a continuation of the previous Block 4 Requirements Decomposition effort which will include activities leading up to a successful System Functional Review (SFR) and select facility upgrades required for Block 4 research, development, test and evaluation. Included in Block 4 are upgraded capabilities and continuous improvements to maintain Air System viability against evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD), reduce life cycle cost, and improve operational suitability. Upgraded capabilities and improvements to include continuous upgrade of joint reprogramming enterprise labs, the continued development and re-architecture of the autonomic logistics information system and training investments. Expected completion of a Block 4.1 Preliminary Design Review (PDR) and a Block 4.2 System Requirements Review (SRR) will address additional Block 4 capabilities requirements. Post-PDR risk reduction, preplanning for subsequent Block 4 Modernization events, and investments to deliver the full Block 4 Air System capabilities are included.<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07. | | | | | |
| ***Title:*** Product Development - Technology Refresh 3 ( TR-3) | 144.550 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Technology Refresh 3 (TR-3) Design Competition, Development, Integration, and Test. This is the design phase of TR-3 program fully supports Block 3F functionality and allows incorporation of all Block 4 capabilities documented in the System Requirements Document (SRD). TR-3 hardware redesign is required to support 4X processing growth factor based on the current processing estimates for all 3F capabilities. Redesign of TR-3 subsystems (Integrated Core Processor (ICP), Aircraft Memory System (AMS), and Panoramic Cockpit | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Display (PCD)) configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary to take the design of the TR-3 System through Critical Design Review (CDR).<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07. | | | | | |
| ***Title:*** Infrastructure and Support Costs<br>***Articles:***<br><br>***Description:*** Funding will support infrastructure investment planning and other test planning activities required for Block 4 development, integration, test and evaluation. Funding related to the Integrated Test Force, government, and contractor labor. Support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, autonomic logistics development, joint reprogramming enterprise, modeling and simulation environment activities and training investment support. Other costs in support of ranges, chase planes and DT site operations.<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07. | 172.641<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Test and Evaluation | 211.105 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Non-recurring engineering required to plan for the service life extension of existing DT aircraft and modification necessary to bring DT aircraft fleet to a common configuration. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare ICD, the Fifth Generation Fighter Modernization ICS, and the Block 4 Capability Development Document (CDD). Execution of all DT activities in support of Block 4.<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 725.610 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0604810N JSF Continuous Capability Development and Delivery | 138.308 | - | - | - | - |
| International Continuous Capability Development and Delivery | 157.042 | - | - | - | - |
| 0207142F JSF Continuous Capability Development and Delivery | 290.891 | - | - | - | - |
| **Navy Subtotals** | 139.369 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604810N/2936: *F-35C Follow On Modernization - Navy* | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 192.135 |
| • USAF/FOD/0207142F: *USAF Continuous Capability Development and Delivery* | 290.891 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 429.671 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • International: *International Continuous Capability Development and Delivery* | 157.042 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 269.976 |

**Remarks**

This is a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Air Force. Program Element 0604800N/0604800M continues USN development efforts budgeted in 0603800N prior to FY2002. The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, and Norway are participants in the SDD phase of JSF.

PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07.

**D. Acquisition Strategy**

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

**E. Performance Metrics**

Overall Block 4 Performance Metrics will reflect Key Performance Parameters established in the F-35 Block 4 Capability Development Document.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prime LM 18-C-1004 (Phase II) | C/CPFF | Lockheed Martin : FT. Worth, TX | 28.140 | 150.345 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 178.485 | 229.397 |
| Prime LM 14-G-0020 (TR3) | C/CPFF | Lockheed Martin : FT. Worth, TX | 96.837 | 144.550 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 241.387 | 231.460 |
| Prime LM BOA 0020 (Nimble Lightning + Pilot Training) | C/CPFF | Lockheed Martin : FT Worth, TX | 4.706 | 4.250 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.956 | 8.956 |
| Prime Flight Test Assets | Various | Various : Various | 0.000 | 9.548 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.548 | 37.548 |
| Prime LM ECASE | C/CPFF | Lockheed Martin : FT. Worth, TX | 0.000 | 4.919 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.919 | 5.000 |
| Prime LM 14-G-0020 DT AC Viability | C/CPFF | Lockheed Martin : FT. Worth, TX | 0.000 | 29.700 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 29.700 | 45.000 |
| Prime LM Infrastructure | C/BA | Lockheed Martin : FT. Worth, TX | 0.000 | 88.800 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 88.800 | 26.312 |
| Prime PW Propulsion | C/CPIF | Pratt & Whitney : Various | 0.000 | 12.509 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.509 | - |
| Prime LM TBD JRE | C/CPFF | Lockheed Martin : FT. Worth, TX | 0.000 | 20.000 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.000 | 7.500 |
| Systems Engineering | C/CPFF | Various : Various | 5.342 | 17.800 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 23.142 | 23.142 |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 144.540 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 144.540 | 144.540 |
| | | **Subtotal** | 279.565 | 482.421 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 761.986 | N/A |

**Remarks**

Block 4 Planning & Systems Engineering on R-2A includes Phase II, Nimble Lightning, ECASE, JRE & Systems Engineering.
Broke out Prime LM Infrastructure line seperately from Block 4 Phase II contract line due to change in contracting strategy.
Broke out Prime LM TBD JRE line seperately from Block 4 Phase II contract line due to change in contracting strategy.
Added Prime PW Propulsion for Flight Test Support.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NAWCAD : Patuxent River, MD | 16.098 | 8.550 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.648 | Continuing |
| Development Support | WR | NAWCWD : China Lake, CA | 1.029 | 2.550 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.579 | - |
| Development Support | Various | Edwards AFB : Edwards AFB, CA | 0.986 | 0.500 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.486 | - |
| Development Support | Various | Eglin : Various | 2.265 | 3.450 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.715 | - |
| Development Support | Various | Various : Various | 16.585 | 15.144 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 31.729 | - |
| Development Support | MIPR | AFLCMC : Wrigth Patterson AFB | 1.286 | 1.778 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.064 | - |
| JRE Development Support | Various | Various : Various | 0.000 | 20.579 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.579 | - |
| ALIS Development Support | Various | Various : Various | 0.000 | 10.739 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.739 | - |
| | | **Subtotal** | 38.249 | 63.290 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 101.539 | N/A |

**Remarks**

Broke out JRE and ALIS Development Support from Block 4 Phase II contract line due to change in contracting strategy.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 45.000 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 45.000 | - |
| Developmental Test & Evaluation | WR | NAWCWD : China Lake , CA | 0.000 | 7.557 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.557 | - |
| Developmental Test & Evaluation Edwards/AFB | Various | Edwards AFB : Edwards AFB, CA | 0.000 | 5.741 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.741 | - |
| Developmental Test & Evaluation | Various | Various : Various | 0.000 | 10.250 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.250 | - |
| Developmental Test Aircraft Viability | WR | AFOTECH : Kirtland AFB, NM | 2.700 | 2.000 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.700 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | Project (Number/Name)<br>2935 / *JSF Follow On Modernization - Marine Corps* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 2.700 | 70.548 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 73.248 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFLCMC Civilian Pay | Various | AFLCMC CIVPAY : Wright Patterson, AFB | 29.377 | 36.500 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 65.877 | - |
| HPSI Program Sppt. | Various | AFLCMC : Wright Patterson, AFB | 0.000 | 10.225 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.225 | - |
| Financial Mgmt Database Support IDS | Various | Various : Various | 0.000 | 0.724 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.724 | - |
| Earned Value/Finance/ Cost ACT-I | Various | Various : Various | 0.000 | 4.450 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.450 | - |
| Systems System High BOS | Various | Various : Various | 0.000 | 10.346 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.346 | - |
| CIO BOS | Various | Various : Various | 0.000 | 7.800 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.800 | - |
| Other CIO Services | Various | Various : Various | 0.000 | 10.629 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.629 | - |
| Other Core Civ Pay | Various | NAWCAD/WD : Various | 0.000 | 20.425 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.425 | - |
| Other Core Contractor Sppt. | Various | Various : Various | 0.000 | 5.113 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.113 | - |
| Travel | Various | Various : Various | 1.900 | 3.139 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.039 | - |
| | | **Subtotal** | 31.277 | 109.351 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 140.628 | N/A |

**Remarks**

Breaking out HPSI AFLCMC funding from AFLCMC Civilian Pay line for visibility purposes.
Added Other Core Civ Pay & Other Core Contractor Support to account for program operations support.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | Project (Number/Name)<br>2935 / *JSF Follow On Modernization - Marine Corps* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost Category Subtotals** | 351.791 | 725.610 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,077.401 | N/A |
| 0604810N JSF Continuous Capability Development and Delivery | - | 138.308 | | - | | - | | - | | - | | | - |
| International Continuous Capability Development and Delivery | - | 157.042 | | - | | - | | - | | - | | | - |
| 0207142F JSF Continuous Capability Development and Delivery | - | 290.891 | | - | | - | | - | | - | | | - |
| **Project Cost Totals** | 351.791 | 139.369 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,077.401 | - |

**Remarks**

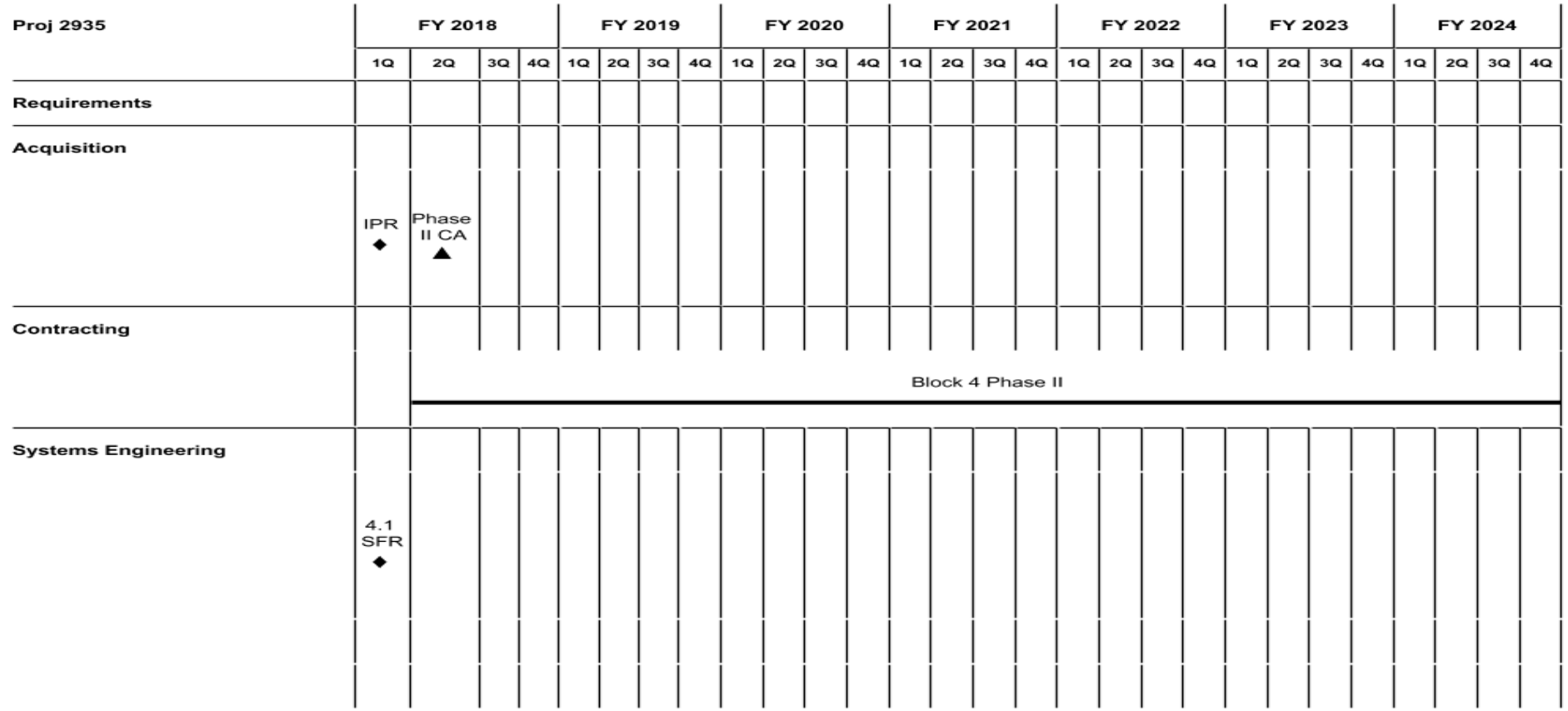
Subtotals and totals may not add due to rounding.

Prior Year reflects $124.113M USAF/$55.327M USN/$59.417M USMC/$112.934M International/Total $351.791

FY 2018 reflects $290.891M USAF/$138.308M USN/$139.369M USMC/$157.042M International/Total $725.610M
FY 2019 continues in PE 0604840M/N as budget moves from BA05 to BA07.
FY 2020 continues in PE 0604840M/N as budget moves from BA05 to BA07.
R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

JSF Continuous Capability Development and Delivery (C2D2) Includes:
USAF PE 0207142F BPAC 675346
USN PE 0604810N Project Unit 2936
USMC PE 0604810M Project Unit 2935
USN PE 0604800N Project Unit 9999 (FY14): $1.500
USMC PE 0604800M Project Unit 999 (FY14) : $1.500

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |




2020PB - 0604810M - 2935

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810M / *(U)Joint Strike Fighter Follow On Mod (FoM) - MC* | **Project (Number/Name)**<br>2935 / *JSF Follow On Modernization - Marine Corps* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2935*** | | | | |
| Acquisition: Block 4 Phase II Contract Award | 2 | 2018 | 2 | 2018 |
| Acquisition: Interim Program Review (IPR) FY18 | 1 | 2018 | 1 | 2018 |
| Contracting: Block 4 Phase II | 2 | 2018 | 4 | 2024 |
| Systems Engineering: 4.1 System Functional Review (SFR) | 1 | 2018 | 1 | 2018 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604810N *I (U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 351.791 | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| 2936: *F-35C C2D2* | 351.791 | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 198 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the United States Navy, United States Air Force, United States Marine Corps and International Partners countries. There are three variants the F-35A Conventional Takeoff and Landing variant; F-35B Short Take Off and Vertical Landing; and the F-35C Aircraft Carrier suitable variant. Maximum commonality among the variants, consistent with National Disclosure Policy, will minimize total air system life cycle costs. Planning and pre-development systems engineering for the Block 4 continues as Initial Operational Capability (IOC) is met for each variant during System Development and Demonstration (SDD).

The JSF Continuous Capability Development and Delivery (C2D2) efforts provide incremental warfighting capability improvements to maintain joint air dominance against evolving threats. C2D2 capability requirements were initiated through ongoing Service-led operational analysis of warfighting gaps identified in the Fifth Generation Fighter Modernization Initial Capabilities Document (ICD), and through F-35 JSF Block 4 Mission Decomposition analysis completed in FY2014. These analyses serve as the basis for the F-35 Block 4 Capabilities Development Document (CDD), staffed through the Air Force Requirements Oversight Council (AFROC) and signed by the USAF Chief of Staff in January 2015. Joint Requirements Oversight Council (JROC) approved the CDD 21 March 2017. Modernization activities in FY2017 and FY2018 include systems engineering, risk reduction, and infrastructure upgrades required to deliver full Air System capabilities to support initial fleet availability of Block 4 upgrades in FY2021.

C2D2 efforts designated as Block 4 include a robust weapons integration portfolio and provide new opportunities for International Partners to assess, integrate, and field unique capabilities based on global sovereign requirements.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark and Norway are participants in F-35 modernization. The program shown here reflects United States Marine Corps funding. Total funding for all Service and International Partners is reported at the accomplishment/planned program level since activities support all aircraft variants. Foreign Military Sales are ongoing separately.

PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0604810N *I (U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 143.855 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 138.308 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -5.547 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -5.547 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

Program Changes:
FY2018 SBIR Reductions as follows: USAF -8.517, USMC -$5.589 & USN -$5.547.
PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07.

Technical: N/A
Schedule: N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | Project (Number/Name)<br>2936 / *F-35C C2D2* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2936: *F-35C C2D2* | 351.791 | 138.308 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 490.099 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 198

**Note**

Total cost, including International partner contributions, USN, USMC, and USAF funding: FY2018 $725.610M; FY2019 continues in PE 0604840M/N as budget moves from BA05 to BA07.

R-2A table shown above reflects service funding only.

R-2A (section B)/R-3 displays combined program for JSF Continuous Capability Development and Delivery (C2D2).

JSF C2D2 Includes:
USAF PE 0207142F BPAC 675346
USN PE 0604810N/ Project Unit 2936
USMC PE 0604810M Project Unit 2935
USN PE 0604800N Project Unit 9999 (FY14): $1.500M
USMC PE 0604800M Project Unit 9999 (FY14): $1.500M
International Partner Contributions

**A. Mission Description and Budget Item Justification**

F-35 C2D2 provides continuing incremental upgrades of the three F-35 variants and associated ground equipment. Upgrades are essential capabilities for Air Interdiction and Strategic Attack, Close Air Support, Suppression and Destruction of Enemy Air Defenses, Offensive and Defensive Counter Air and expanded Surface Warfare. The C2D2 acquisition strategy is based upon incremental deliveries of capabilities. The strategy includes periodic deliveries with a focus on hardware, tech refresh and softwre. C2D2 capability planning includes an efficient transition from F-35 SDD to C2D2. As SDD development activities ramp down C2D2 will assume responsibility for improvements and modernization efforts.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development - Block 4 Planning and Systems Engineering | 197.314 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Block 4 Planning and Systems Engineering preliminarily design and delta System Requirements Review (SRR) for all variants of the F-35 Aircraft. Modernization efforts is the Requirements Decomposition of capabilities for the entire Block 4 upgrade to include sub-blocks 4.1 and 4.2. This is a continuation of the previous Block 4 Requirements Decomposition effort which will include activities leading up to a successful System Functional Review (SFR) and select facility upgrades required for Block 4 research, development, test and evaluation. Included in Block 4 are upgraded capabilities and continuous improvements to maintain Air System viability against evolving threats indicated in the Electronic Warfare Initial Capabilities Document (ICD), the Fifth Generation Fighter Modernization ICD, and the Block 4 Capability Development Document (CDD), reduce life cycle cost, and improve operational suitability. Upgraded capabilities and improvements to include continuous upgrade of joint reprogramming enterprise labs, the continued development and re-architecture of the autonomic logistics information system and training investments. Expected completion of a Block 4.1 Preliminary Design Review (PDR) and a Block 4.2 System Requirements Review (SRR) will address additional Block 4 capabilities requirements. Post-PDR risk reduction, preplanning for subsequent Block 4 Modernization events, and investments to deliver the full Block 4 Air System capabilities are included.<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BA05 to BA07. | | | | | |
| ***Title:*** Product Development - Technology Refresh 3 ( TR-3) | 144.550 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Technology Refresh 3 (TR-3) Design Competition, Development, Integration, and Test. This is the design phase of TR-3 program fully supports Block 3F functionality and allows incorporation of all Block 4 capabilities documented in the System Requirements Document (SRD). TR-3 hardware redesign is required to support 4X processing growth factor based on the current processing estimates for all 3F capabilities. Redesign of TR-3 subsystems Integrated Core Processor (ICP), Aircraft Memory System (AMS), and Panoramic Cockpit | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Display (PCD)) configurations will contain new backplane technology, commercial operating systems, and modified middleware necessary to take the design of the TR-3 System through Critical Design Review (CDR).<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BBA05 to BA07. | | | | | |
| ***Title:*** Infrastructure and Support Costs<br>***Articles:***<br><br>***Description:*** Funding will support infrastructure investment planning and other test planning activities required for Block 4 development, integration, test and evaluation. Funding related to the Integrated Test Force, government, and contractor labor. Support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, autonomic logistics development, joint reprogramming enterprise, modeling and simulation environment activities and training investment support. Other costs in support of ranges, chase planes and DT site operations.<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BBA05 to BA07. | 172.641<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Test and Evaluation | 211.105 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Non-recurring engineering required to plan for the service life extension of existing DT aircraft and modification necessary to bring DT aircraft fleet to a common configuration. Additional upgrades required to support development and evaluation of improvements driven by changes in the threat environment and as identified in the Electronic Warfare ICD, the Fifth Generation Fighter Modernization ICS, and the Block 4 Capability Development Document (CDD). Execution of all DT activities in support of Block 4.<br><br>***FY 2019 Plans:***<br>FY19 effort continues in PE 0604840M/N.<br><br>***FY 2020 Base Plans:***<br>FY20 effort continues in PE 0604840M/N.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>PE 0604810M/N ending in FY18 and continues in PE 0604840M/N as budget moves from BBA05 to BA07. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 725.610 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0604810M JSF Continuous Capability Development and Delivery | 139.369 | - | - | - | - |
| International Continuous Capability Development and Delivery | 157.042 | - | - | - | - |
| 0207142F JSF Continuous Capability Development and Delivery | 290.891 | - | - | - | - |
| **Navy Subtotals** | 138.308 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E/0604810M/2935: *F-35C Follow On Modernization - Marine Corps* | 139.369 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 197.286 |
| • USAF/FOM/0207142F: *USAF Continuous Capability Development and Delivery* | 290.891 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • International: *International Continuous Capability Development and Delivery* | 157.042 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

**Remarks**

This is a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Navy. Program Element 0604800N/0604800M continues USN development efforts budgeted in 0603800N prior to FY2002. The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, and Norway are participants in the SDD phase of JSF.

PE 0604810M/N ending in FY18 and continies in PE 0604840M/N as budget moves from BA05 to BA07.

**D. Acquisition Strategy**

The C2D2 acquisition strategy is to employ both Cost and Fixed Price Incentive contracts for the Block 4 engineering and development efforts. A new modernization contract structure will be established for all post SDD Block 4 efforts. In addition, a separate Basic Ordering Agreement or Indefinite Quantity/Indefinite Delivery contract is planned to provide a long term approach to upgrading and maintaining laboratories and test aircraft and supporting technology maturation for future C2D2 capabilities.

**E. Performance Metrics**

Overall Block 4 Performance Metrics will reflect Key Performance Parameters established in the F-35 Block 4 Capability Development Document.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prime LM TBD (Phase II) | C/CPFF | Lockheed Martin : FT. Worth, TX | 28.140 | 150.345 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 178.485 | 304.660 |
| Prime LM 14-G-0020 (TR3) | C/CPFF | Lockheed Martin : FT Worth, TX | 96.837 | 144.550 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 241.387 | 768.965 |
| Prime LM BOA 0020 (Nimble Lightning + Pilot Training) | C/CPFF | Lockheed Martin : FT Worth, TX | 4.706 | 4.250 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.956 | 24.676 |
| Prime LM Flight Test Asset | Various | Lockheed Martin : FT Worth, TX | 0.000 | 9.548 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.548 | 107.172 |
| Prime LM IDIQ TBD (ECASE) | C/CPFF | Lockheed Martin : FT. Worth, TX | 0.000 | 4.919 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.919 | 100.000 |
| Prime LM TBD DT AC Viability | C/CPFF | Lockheed Martin : Ft. Worth, TX | 0.000 | 29.700 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 29.700 | 174.000 |
| Prime LM Infrastructure | C/CPFF | Lockheed Martin : FT Worth, TX | 0.000 | 88.800 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 88.800 | - |
| Prime PW Propulsion | C/CPIF | Pratt & Whitney : Various | 0.000 | 12.509 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.509 | - |
| Prime LM TBD JRE | C/CPFF | Lockheed Martin : FT Worth, TX | 0.000 | 20.000 | Jan 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.000 | - |
| Systems Engineering | C/CPFF | Various : Various | 5.342 | 17.800 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 23.142 | 97.646 |
| Prior Year No Longer Funded in FYDP | Various | Various : Various | 144.540 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 144.540 | - |
| | | **Subtotal** | 279.565 | 482.421 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 761.986 | N/A |

**Remarks**

Block 4 Planning & Systems Engineering on R-2A includes Phase II, Nimble Lightning, ECASE, JRE & Systems Engineering.
Broke out Prime LM Infrastructure line separately from Block 4 Phase II contract line due to change in contracting strategy.
Broke out Prime LM TBD JRE line separately from Block 4 Phase II contract line due to change in contracting strategy.
Added Prime PW Propulsion for Flight Test Support.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | WR | NAWCAD : Patuxent River, MD | 16.098 | 8.550 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.648 | Continuing |
| Development Support | WR | NAWCWD : China Lake, CA | 1.029 | 2.550 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.579 | - |
| Development Support | Various | Edwards AFB : Edwards AFB, CA | 0.986 | 0.500 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.486 | - |
| Development Support | Various | Eglin : Various | 2.265 | 3.450 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.715 | - |
| Development Support | Various | Various : Various | 16.585 | 15.144 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 31.729 | - |
| Development Support | MIPR | AFRL : Wright Patterson AFB | 1.286 | 1.778 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.064 | - |
| JRE Development Support | Various | Various : Various | 0.000 | 20.579 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.579 | - |
| ALIS Development Support | Various | Various : Various | 0.000 | 10.739 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.739 | - |
| | | **Subtotal** | 38.249 | 63.290 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 101.539 | N/A |

**Remarks**

Broke out JRE and ALIS Development Support from Block 4 Phase II contract line due to change in contracting strategy.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 45.000 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 45.000 | - |
| Developmental Test & Evaluation | WR | NAWCWD : China Lake , CA | 0.000 | 7.557 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.557 | - |
| Developmental Test & Evaluation Edwards/AFB | Various | Edwards AFB : Edwards AFB, CA | 0.000 | 5.741 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.741 | - |
| Developmental Test & Evaluation | Various | Various : Various | 0.000 | 10.250 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.250 | - |
| Operational Test & Evaluation | WR | AFOTEC : Kirtland AFB, NM | 2.700 | 2.000 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.700 | 255.683 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 2.700 | 70.548 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 73.248 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AFLCMC Civilian Pay | Various | AFLCMC CIVPAY : Wright Patterson, AFB | 29.377 | 36.500 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 65.877 | - |
| HPSI Program Sppt. | C/BA | AFLCMC : Wright Patterson, AFB | 0.000 | 10.225 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.225 | - |
| Financial Mgmt Database Support IDS | Various | Various : Various | 0.000 | 0.724 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.724 | - |
| Earned Value/Finance/ Cost ACT-I | Various | Various : Various | 0.000 | 4.450 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.450 | - |
| Systems System High BOS | Various | Various : Various | 0.000 | 10.346 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.346 | - |
| CIO BOS | C/BA | Various : Various | 0.000 | 7.800 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.800 | - |
| Other CIO Services | Various | Various : Various | 0.000 | 10.629 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.629 | - |
| Other Core Civ Pay | WR | NAWCAD/WD : Various | 0.000 | 20.425 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.425 | - |
| Other Core Contractor Sppt. | Various | Various : Various | 0.000 | 5.113 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.113 | - |
| Travel | Various | Various : Various | 1.900 | 3.139 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.039 | - |
| | | **Subtotal** | 31.277 | 109.351 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 140.628 | N/A |

**Remarks**

Breaking out HPSI AFLCMC funding from AFLCMC Civilian Pay line for visibility purposes.
Added Other Core Civ Pay & Other Core Contractor Sppt to account for program operations support.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | Project (Number/Name)<br>2936 / *F-35C C2D2* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cost Category Subtotals** | 351.791 | 725.610 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,077.401 | N/A |
| 0604810M JSF Continuous Capability Development and Delivery | - | 139.369 | | - | | - | | - | | - | | | - |
| International Continuous Capability Development and Delivery | - | 157.042 | | - | | - | | - | | - | | | - |
| 0207142F JSF Continuous Capability Development and Delivery | - | 290.891 | | - | | - | | - | | - | | | - |
| **Project Cost Totals** | 351.791 | 138.308 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1,077.401 | - |

**Remarks**

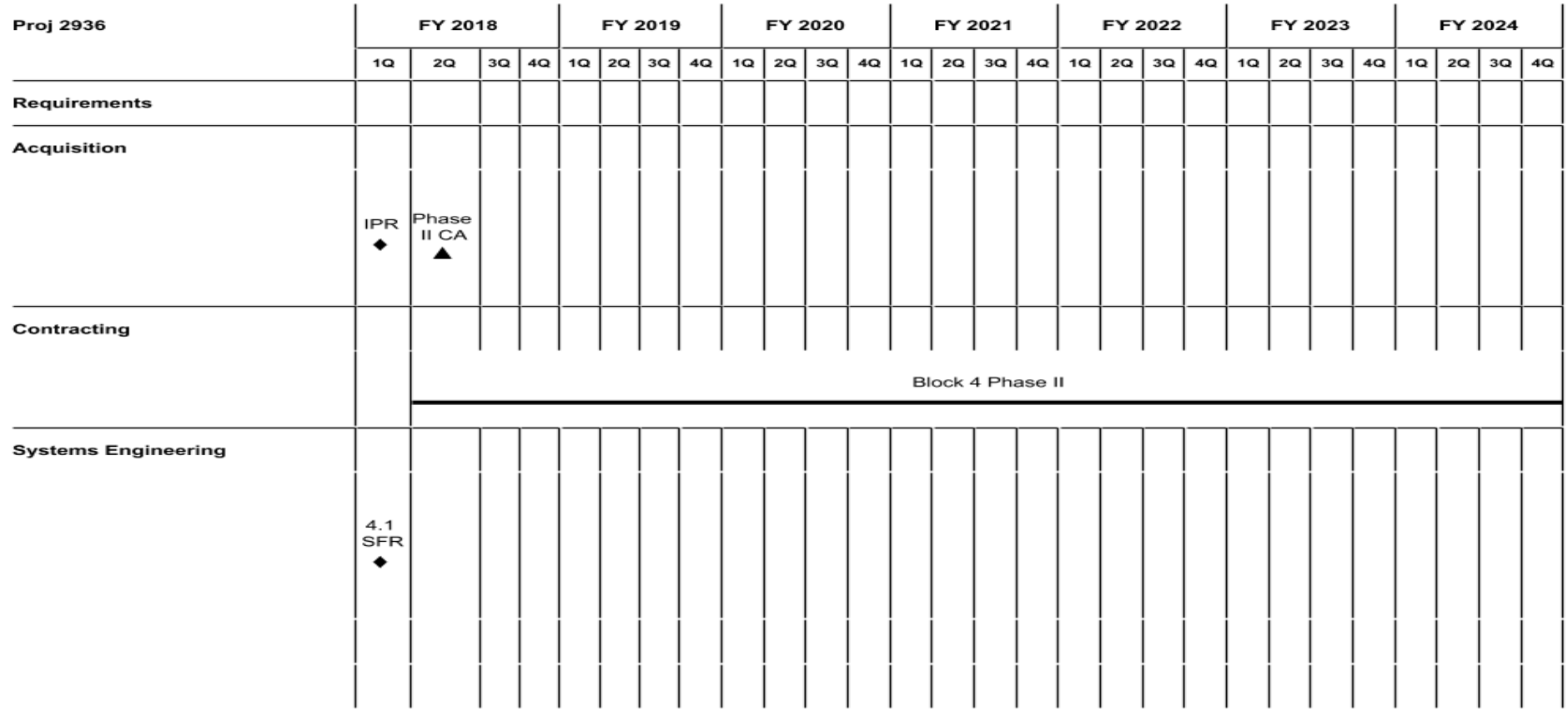
Subtotals and totals may not add due to rounding.

Prior Year reflects $124.113M USAF/$55.327M USN/$59.417M USMC/$112.934M International/Total $351.791

FY 2018 reflects $290.891M USAF/$138.308M USN/$139.369M USMC/$157.042M International/Total $725.610M
FY 2019 continues in PE 0604840M/N as budget moves from BA05 to BA07.
FY 2020 continues in PE 0604840M/N as budget moves from BA05 to BA07.
R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

JSF Continuous Capability Development and Delivery (C2D2) Includes:
USAF PE 0207142F BPAC 675346
USN PE 0604810N Project Unit 2936
USMC PE 0604810M Project Unit 2935
USN PE 0604800N Project Unit 9999 (FY14): $1.500
USMC PE 0604800M Project Unit 999 (FY14) : $1.500

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |




2020PB - 0604810N - 2936

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0604810N / *(U)Joint Strike Fighter Follow On Mod (FoM) - Navy* | **Project (Number/Name)**<br>2936 / *F-35C C2D2* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2936*** | | | | |
| Acquisition: Block 4 Phase II Contract Award | 2 | 2018 | 2 | 2018 |
| Acquisition: Interim Program Review (IPR) FY18 | 1 | 2018 | 1 | 2018 |
| Contracting: Block 4 Phase II | 2 | 2018 | 4 | 2024 |
| Systems Engineering: 4.1 System Functional Review (SFR) | 1 | 2018 | 1 | 2018 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605013M *I Marine Corps IT Dev/Mod* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 86.212 | 14.497 | 11.030 | 1.494 | - | 1.494 | 1.407 | 1.181 | 1.207 | 1.231 | Continuing | Continuing |
| 2906: *Marine Corps IT* | 86.212 | 14.497 | 11.030 | 1.494 | - | 1.494 | 1.407 | 1.181 | 1.207 | 1.231 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This program establishes, sustains, and continuously refines computing platforms and Information Technology (IT) services as tested, certified and reusable components of a Marine Corps IT framework that spans the range of military and garrison operations.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 14.865 | 14.005 | 3.797 | - | 3.797 |
| Current President's Budget | 14.497 | 11.030 | 1.494 | - | 1.494 |
| Total Adjustments | -0.368 | -2.975 | -2.303 | - | -2.303 |
| • Congressional General Reductions | - | -0.112 | | | |
| • Congressional Directed Reductions | - | -2.863 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 0.198 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.567 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -2.303 | - | -2.303 |
| • Rate/Misc Adjustments | 0.001 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

The FY 2019 to FY 2020 funding decrease is due to the completion of several Manpower, Recruiting and Financial System modernization efforts.

The FY 2020 funding request was reduced by $2.303M to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0605013M / *Marine Corps IT Dev/Mod* | | | | Project (Number/Name)<br>2906 / *Marine Corps IT* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2906: *Marine Corps IT* | 86.212 | 14.497 | 11.030 | 1.494 | - | 1.494 | 1.407 | 1.181 | 1.207 | 1.231 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

The FY2020 funding request was reduced by $2.303M to account for the availability of prior year execution balances.

**A. Mission Description and Budget Item Justification**

Manpower Operations Systems (MOS) is a portfolio of enterprise IT systems and modules that support manpower business operations for the Total Force (active and reserve). The investment in the portfolio improves dataflow and increases reliability, functionality, and accuracy of data while reducing the manpower required to operate and maintain these systems/operations. Development is partially driven by regulatory and policy changes mandated by Congress, DOD, Department of the Navy (DON), and United States Marine Corps (USMC). These systems support all five tiers of Manpower: 1) Individual Marine, 2) Small Unit Leader; 3) Unit, 4) Installation Personnel Administration Center (IPAC)/Disbursing Echelon, and 5) Headquarters Marine Corps (HQMC) Manpower and Reserve Affairs (M&RA)/ Defense Finance and Accounting Service. The MOS portfolio provides support in functional areas such as permanent change of station assignments, retention, mobilization, manpower planning, line of duty determination, personnel accountability, individual augmentation, personnel records management and maintenance, management of case incidents, civilian professional development planning, pay entitlement determinations, promotion and performance evaluations and self-service/visibility of personnel data. MOS programs interface with other systems to provide manpower data and web services functionality for pay and personnel transactions between systems. Systems in the portfolio include the Web-enabled Manpower Assignment Support System (WebMASS), Performance Evaluation System (PES), Total Force Retention System (TFRS), Optical Digital Imaging - Records Management System (ODI-RMS), Manpower Mobilization Assignment System (MMAS), and the Requirements, Transition and Manpower Management System (RTAMMS) Total Force Administration System (TFAS) (composed of the Secure Personnel Accountability (SPA) Module, Automated Performance Evaluation System (APES) and the Drill Management Module (DMM). The current system has become obsolete and is unable to maintain an acceptable Cyber Security posture. Modernization efforts will involve business process and application reengineering; delivering an application on a modern and secure platform.

Marine Corps Enterprise Information Technology Services (MCEITS) provides an overarching portfolio of capabilities to deliver "Power to the Edge" for the Marine Corps. Born from an effort to establish a Continuity of Operations Plan of HQMC Automated Information Systems, MCEITS enables realignment of the existing USMC environment of applications, databases, networks, and facilities into an integrated architecture of programs to deliver new information technology capabilities based on a common infrastructure and shared services. MCEITS is a unifying framework of both the Enterprise Services to be delivered, and the infrastructure and systems which must be deployed to enable delivery of those services. Initially it will encompass the Operational, Technical, and Systems architectures of the enterprise environment. However, ultimately it will extend to transform information access both in garrison and in the deployed environment. Combined with policy, procedure and standards provided by HQMC (C4), MCEITS will allow for architectural standardization, consolidated management, and seamless interoperability of and access to the data residing in currently fielded applications (business and tactical). Testing efforts will be focused on MCEITS provided services operating within a MCEITS hosting environment. MCEITS enables services to be federated throughout the Marine Corps to include Content Discover and Delivery, Collaboration and Text Chat, between the service consumer and provider. Efforts for MCEITS will focus on application migration development, the analysis, research and design of increments 3 & 4 and the technology

refreshed software and hardware infrastructure, modernized and enhanced MCEITS high availability, automation and service management with continued Pre-Planned Product Improvements (P3I) efforts.

Marine Corps Recruiting Information Support System (MCRISS) is an enterprise level system to automate administrative procedures for the recruiting station operations. This customized automated System, centered on procedures in the Guidebook for Recruiters, Volume I, dramatically improves efficiency and effectiveness in Marine Corps recruiting. Furthermore, Military Entrance Processing Command requires Marine Corps recruiting to provide information in electronic format only. MCRISS is the Marine Corps Recruiting Command's program to manage applicant processing from commitment to accession/commission into the Marine Corps and Marine Corps Reserve. This enterprise approach allows for efficient sharing of information about potential recruits and recruiter screening efforts, yielding a more cost effective process. The current system requires modernization of the systematic recruiting components to provide efficiency for the Recruiting force from the Headquarters element down to the Recruiter, and requires numerous updates in order to become fully compliant with Cyber Security and CNA policies and mandates to protect PII/PHI data captured and stored in the system. The Modernization effort will involve a competitive evaluation of several prototype systems, leading to a selection of a viable platform and the complete replacement of the current MCRISS system with modern and secure technology.

Paperless Office/Acquisition (PA) funding supports development and enhancement of Purchase Request (PR) Builder, which is the Marine Corps enterprise solution for the electronic generation of purchase requests, funding documents, miscellaneous payments, and serves as the front-end system for feeding the DOD enterprise contracting writing system Standard Procurement System (SPS). PR Builder is a fully web-based, Mission Assurance Category (MAC) III sensitive business system that provides the Marine Corps with a net-centric capability to electronically create, route for approval, and apply funding to Purchase Request (PRs), Funding Documents, and Miscellaneous Payments. PR Builder is the authoritative procurement generation system within the Marine Corps electronic Paperless Acquisition (PA) Systems Business Enterprise that provides system-to-system interaction with the Marine Corps' Standard Procurement System (SPS) / Procurement Desktop Defense (PD2,Department of Defense (DoD) Standard Accounting, Budgeting, and Reporting
System (SABRS), Electronic Document Access (EDA), and the Federal Procurement Data Standard - Next Generation (FPDS-NG). These systems are critical to Marine Corps purchasing, contracting and procurement tracking control.

Defense Readiness Reporting System-Marine Corps (DRRS-MC) - the Command Individual Risk and Resiliency Assessment System (CIRRAS), formerly known as the Force Preservation Program Tool Integrated Clinical Management-Risk Mitigation System (FPPT ICM-RMS), funding will develop software to enable commanding officers and senior enlisted advisors to make more informed and timely decisions on Force Preservation (FP) risk assessments, based on identifying and tracking individual Service Member (SM) behaviors associated with increased risk or resiliency as defined by the Marine Corps "Six Fs" (Fidelity, Fighter, Fitness, Family, Finances, and Future). CIRRAS will close FP implementation and process gaps by fielding an enterprise-wide system to manage individual SM FP risk by providing a consistent approach and a standardized methodology to support protective factors and mitigate adverse outcomes. This funding will deploy additional FP functionality to increase the ability to perform, inform, and record behavioral Service Member risk assessment within the Marine Corps. The enhanced CIRRAS capabilities to be implemented will automate the risk and resiliency scores, send automated alerts to leadership of "at risk" personnel, and implement additional system interfaces that will provide further key FP indicator data to assist in prevention of SM suicide.

Risk Management Initiative (RMI) funding addresses outdated Safety systems, capability gaps and support logistics Information Technology (IT) portfolio rationalization. When completed, RMI will consolidate DoN risk management requirements into a single Program of Record (POR) and provide modern Safety capabilities for the military component of the Navy Total Force (both active and reserve). The USN serves as the lead for this effort with the Marine Corps providing a fair share towards

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

development starting in FY16 (~20%). RMI capability consists of four distinct increments of capability: (1) Streamlined Incident Reporting (SIR), (2) Single Point of Entry (SPOE), (3) Safety Program Management (SPM), (4) Analysis and Dissemination (A&D). These four pillars will enable agile responses to business rule changes, automation of routine actions, improvement of data integrity and facilitation of self-service for organizations and individuals.

Technology Services Organization (TSO): This Technical refresh/upgrade of Standard Accounting Budgeting Reporting System (SABRS) database technology from ADABAS to a newer database architecture provides a modern and well-supported database technology that ultimately enables the normalization of Marine Corps financial data in a true relational database.
The newer database architecture will provide a modern data platform to support transactional operations within the DON General Fund accounting systems to optimize performance, readily scale, and reliably support data structure, quality, and availability for subsequent analysis to drive decision making. Successful implementation will be transparent to the SABRS user community while minimizing the potential for unanticipated system degradation/outages and secure the system's operational longevity. This Multi phased project (over 4 years), system supports 5k+ direct users, impacts entire DON General Funds accounting. Out year costs will be assumed into planned sustainment of SABRS.
The current configuration is antiquated with diminishing industry support. There is a limited pool of applicants available to work on ADABAS. Sustainment is cost prohibitive and the technology stack limits flexibility to fully support 21st century data/system requirements. TSO will be unable to mitigate identified technical and support risk associated with current technology which could result in systems degradation and/or outage. This further leaves TSO unable to improve data integrity and audit compliance in SABRS by employing a more modern database.
The impact on the operational capability is the risk to DON accounting and Financial Management operations increases daily for major system degradation or outage in both likelihood of occurrence and extent of the negative impact of such an occurrence. This will result in the system becoming less and less viable to the point where it will no longer support Marine Corps operations.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Defense Readiness Reporting System-Marine Corps (DRRS-MC) | 1.355 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** MANPOWER OPERATIONS SYSTEMS (MOS) | 2.415 | 0.000 | 0.180 | 0.000 | 0.180 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 Base Plans:***<br>Continue development of Optical Digital Imaging - Records Management System (ODI-RMS) Modernization efforts.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>$0.180 funding increase from FY19 is due to continued development of Manpower Personnel Administration (MPA) Modernization efforts. | | | | | |
| ***Title:*** MARINE CORPS ENTERPRISE INFORMATION TECHNOLOGY SERVICES (MCEITS)<br>***Articles:***<br>***FY 2019 Plans:***<br>-Completed scaling infrastructure capacity to host additional applications planned to migrate.<br>-Completed analysis, research, and design for the MCEITS Increment 3 & 4 and Development Environment.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funds decreased from $1.480M in FY 2019 to $0.000M in FY 2020 due to the program to the program transitioning into the sustainment phase. | 1.321<br>- | 1.480<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** MARINE CORPS RECRUITING INFORMATION SUPPORT SYSTEM (MCRISS)<br>***Articles:***<br>***Description:*** The effort will support the modernization of MCRISS. The current system requires modernization of the systematic recruiting components to provide efficiency for the Recruiting force from the Headquarters element down to the Recruiter, and requires numerous updates in order to become fully compliant with Cyber Security and CNA policies and mandates to protect PII/PHI data captured and stored in the system. The Modernization effort will involve a competitive evaluation of several prototype systems, leading to a selection | 5.293<br>- | 4.210<br>- | 0.321<br>- | 0.000<br>- | 0.321<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| of a viable platform and the complete replacement of the current MCRISS system with modern and secure technology.<br><br>***FY 2019 Plans:***<br>-Continue MCRISS Modernization effort.<br><br>***FY 2020 Base Plans:***<br>-Complete the development and fielding of MCRISS Modernization effort.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>$3.889M funding decrease from FY19 is due to completion of development and fielding MCRISS Modernization. | | | | | |
| ***Title:*** PAPERLESS ACQUISITION (PA)<br>***Articles:***<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>-Initiate Research, development and testing of PR Builder capability/interface to interact with the new Navy Electronic Procurement System (ePS) capability to replace current Standard Procurement System (SPS).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase is due to the Department of the Navy's decision to upgrade to the electronic Procurement System (ePS) capability. This increase in RDTEN funding will ensure Marine Corps organizations, once migrated to ePS, will continue operating in a safe and secure environment, and the Marine Corps will continue maintaining its Clean Audit readiness capability. | 0.000<br>- | 0.000<br>- | 0.542<br>- | 0.000<br>- | 0.542<br>- |
| ***Title:*** SAFETY - RISK MANAGEMENT INITIATIVE (RMI)<br>***Articles:***<br><br>***Description:*** RISK MANAGEMENT INITIATIVE (RMI)<br>The RMI program is a consolidation of Navy and Marine Corps risk management requirements into a single safety system, thus eliminating the need to modify multiple legacy systems. The Navy serves as the lead for this | 0.800<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| effort with the Marine Corps providing a fair share (approximately 20%) towards the research and development of the RMI system starting in FY16.<br>The Navy portion is funded in PE 0605013N / Information Technology Development; Project 2905.L39 / BUPERS IT<br><br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** TECHNOLOGY SERVICES ORGANIZATION (TSO)<br>***Articles:***<br>***FY 2019 Plans:***<br>- Continue research and development of the most efficient approach for transitioning the DON General Fund Accounting System, SABRS, to a modern data platform.<br>- Initiate and complete Manpower Personnel Administration (MPA) Modernization efforts.<br>***FY 2020 Base Plans:***<br>- Continue research and development of the most efficient approach for transitioning the DON General Fund Accounting System, SABRS, to a modern data platform.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease from FY2019 to FY2020 is due to the completion of HR2025. | 3.313<br>- | 5.340<br>- | 0.451<br>- | 0.000<br>- | 0.451<br>- |
| **Accomplishments/Planned Programs Subtotals** | 14.497 | 11.030 | 1.494 | 0.000 | 1.494 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/4630 - MCRISS: *MC Recruiting Info Support System* | 0.049 | 0.362 | 0.050 | - | 0.050 | 0.050 | 0.051 | 0.052 | 0.053 | Continuing | Continuing |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/4630 - PA: *Paperless Office/Acquisition* | 0.122 | 0.124 | 0.127 | - | 0.127 | 0.130 | 0.133 | 0.136 | 0.139 | Continuing | Continuing |
| • PMC/4630-MCEITS: *MC Enterprise IT Services* | 9.536 | 25.128 | 18.010 | - | 18.010 | 4.431 | 4.548 | 8.195 | 8.312 | Continuing | Continuing |
| • PMC/4620- MOS: *Manpower Operations Systems (MOS)* | 1.868 | 0.246 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • PMC/4630 - TSO: *Technology Services Organization (TSO)* | 1.305 | 0.878 | 3.891 | - | 3.891 | 3.909 | 1.404 | 0.945 | 0.964 | 0.000 | 14.966 |

**Remarks**

**D. Acquisition Strategy**

Organizational Messaging Service (OMS) is a Joint Acquisition Category (ACAT) IAM program. It is Assistant Secretary Defense Command, Control, Communication and Intelligence mandated. Each year the Joint Interoperability Test Command (JITC) runs Operational Test (OT) assessments on OMS software versions and maintenance releases. Marine Corps participation is vital to ensuring that the implementation of OMS is interoperable with all DOD CINCs, services, and agencies. Furthermore, as follow-on organizational messaging solutions for OMS are being identified, materiel solution analysis activities will be conducted.

Manpower Operations Systems (MOS) within this portfolio follows an Evolutionary Acquisition (EA) approach: 1. Define, develop, and deliver an initial or "core" capability based on mature technology. 2. "Core" capability will be incrementally improved over an extended period of time. Incremental Development Model: 1. Iterative cycles of requirements definition, design, build and evaluation. The contracting strategy across the portfolio is to utilize competitive firm-fixed price contracts.

Marine Corps Enterprise Information Technology Services (MCEITS) is using an incremental acquisition approached implemented in separate releases followed by Pre-Planned Product Improvements (P3Is) delivering capabilities faster and more efficiently. The program will deliver an initial capability and continue integration and production of the system in accordance with the USMC Information Enterprise Strategy. The objective is to balance needs with available commercial and government solutions and resources, and to rapidly adopt evolving technologies and requirements and keep pace with the continuously evolving DoD Net-Centric enterprise to provide capabilities to the Marines. This strategy is supported by an Indefinite Delivery Indefinite Quantity contracting vehicle which will allow the contractor to provide the full range of capabilities, services and solutions necessary to satisfy the requirements through incremental implementation of technology, processes and capabilities. Capabilities will be delivered through individual task orders to ensure technology and services are inserted according to the overall program goals, user requirements and program schedule.

Paperless Acquisition (PA) will use an incremental development methodology utilizing short development periods. The contracting strategy is to use a firm-fixed price contract to reduce risk to government, with additional capabilities defined by a Marine Corps Configuration Control Board and delivered to the service integrator as a modification to the contract. The delivery of small functional capabilities allows for measurable enhancements to the base system while keeping Post Deployment System Support costs relatively low.

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

Defense Readiness Reporting System-Marine Corps (DRRS-MC) is a Mission Assurance Category I (MAC I) Classified system that integrates information on reportable unit readiness (Marines/ Equipment) and mission effectiveness of deployed and contingency forces. Mission (Core/Assigned) determined to be vital to the operational readiness and mission effectiveness of deployed and contingency forces. The operation mission of Command Individual Risk and Resiliency Assessment System (CIRRAS), formerly known as Force Preservation Program Tool Integrated Clinical Management-Risk Mitigation System (FPPT ICM-RMS), is that it will enable Commanding Officers and Senior Enlisted Advisors to make informed decisions on force preservation assessments.

Marine Corps Recruiting Information Support System (MCRISS) utilizes modular/incremental development to maintain system operability while allowing for continued development. Contracting strategy for Legacy system support includes competitive firm-fixed price IDIQ contracts; MCRISS Modernization effort to be executed leveraging direct-award opportunity to a qualified 8(a) small business partner.

Risk Management Initiative (RMI) consolidates risk management requirements into a single system utilizing a single vendor Indefinite Delivery / Indefinite Quantity (IDIQ). The USN serves as the lead for the RMI effort with the Marine Corps providing a fair share towards development. The approach for RMI is an incremental COTS configuration model providing usable increments of capability within 24-month cycles after funds certification for each. Development of the Streamlined Incident Reporting and Single Point of Entry capability increments via separate task orders using RDT&E .

Technology Services Organization (TSO) SABRS: Funding will assist with research and development of the most efficient approach for transitioning the DON General Fund Accounting System, SABRS, to a modern data platform in order to eliminate the risk associated with an aging and expensive technology with dwindling number of technical experts. This Technical refresh/upgrade of SABRS database technology from ADABAS to a newer database architecture provides a modern and well-supported database technology that ultimately enables the normalization of Marine Corps financial data in a true relational database.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
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| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013M / *Marine Corps IT Dev/Mod* | Project (Number/Name)<br>2906 / *Marine Corps IT* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MOS ODI-RMS Modernization | SS/IDIQ | CHENEGA DECISION SCIENCES, LLC : Lorton, VA | 0.000 | 1.932 | Jul 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.932 | - |
| MCRISS Modernization | SS/IDIQ | CHENEGA DECISION SCIENCES, LLC : Lorton, VA | 0.700 | 5.293 | Feb 2019 | 4.210 | Apr 2019 | 0.321 | Jan 2020 | - | | 0.321 | 0.000 | 10.524 | - |
| Paperless Ofc Acq Dev | C/FFP | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.542 | May 2020 | - | | 0.542 | Continuing | Continuing | Continuing |
| RMI | C/BA | SPAWAR: : San Diego, CA | 0.400 | 0.800 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.200 | - |
| DRRS-MC (FPPT ICM-RMS) - Software Development | C/CPFF | SPAWAR : Charleston, SC | 0.000 | 1.355 | Feb 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.355 | - |
| MOS ODI-RMS Modernization | TBD | TBD : TBD | 0.000 | 0.483 | Apr 2019 | 0.000 | | 0.180 | Mar 2020 | - | | 0.180 | 0.000 | 0.663 | - |
| MPA Modernization | TBD | TBD : TBD | 0.000 | 3.000 | Apr 2019 | 5.000 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 8.000 | - |
| TSO | TBD | TBD : TBD | 0.000 | 0.313 | Sep 2018 | 0.340 | Aug 2019 | 0.451 | Aug 2020 | - | | 0.451 | 0.000 | 1.104 | - |
| Prior Years Cumulative Funding | Various | Various : Various | 52.599 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 53.699 | 13.176 | | 9.550 | | 1.494 | | - | | 1.494 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Years Cumulative Funding | Various | Various : Various | 17.871 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.871 | - |
| MCEITS HSI | WR | NSWC : Dahlgren, VA | 0.290 | 0.085 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.375 | - |
| MCEITS Application Migration Support | TBD | TBD : TBD | 1.493 | 1.236 | Feb 2018 | 1.480 | Feb 2019 | 0.000 | | - | | 0.000 | 0.000 | 4.209 | - |
| | | **Subtotal** | 19.654 | 1.321 | | 1.480 | | 0.000 | | - | | 0.000 | 0.000 | 22.455 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013M / *Marine Corps IT Dev/Mod* | Project (Number/Name)<br>2906 / *Marine Corps IT* | |

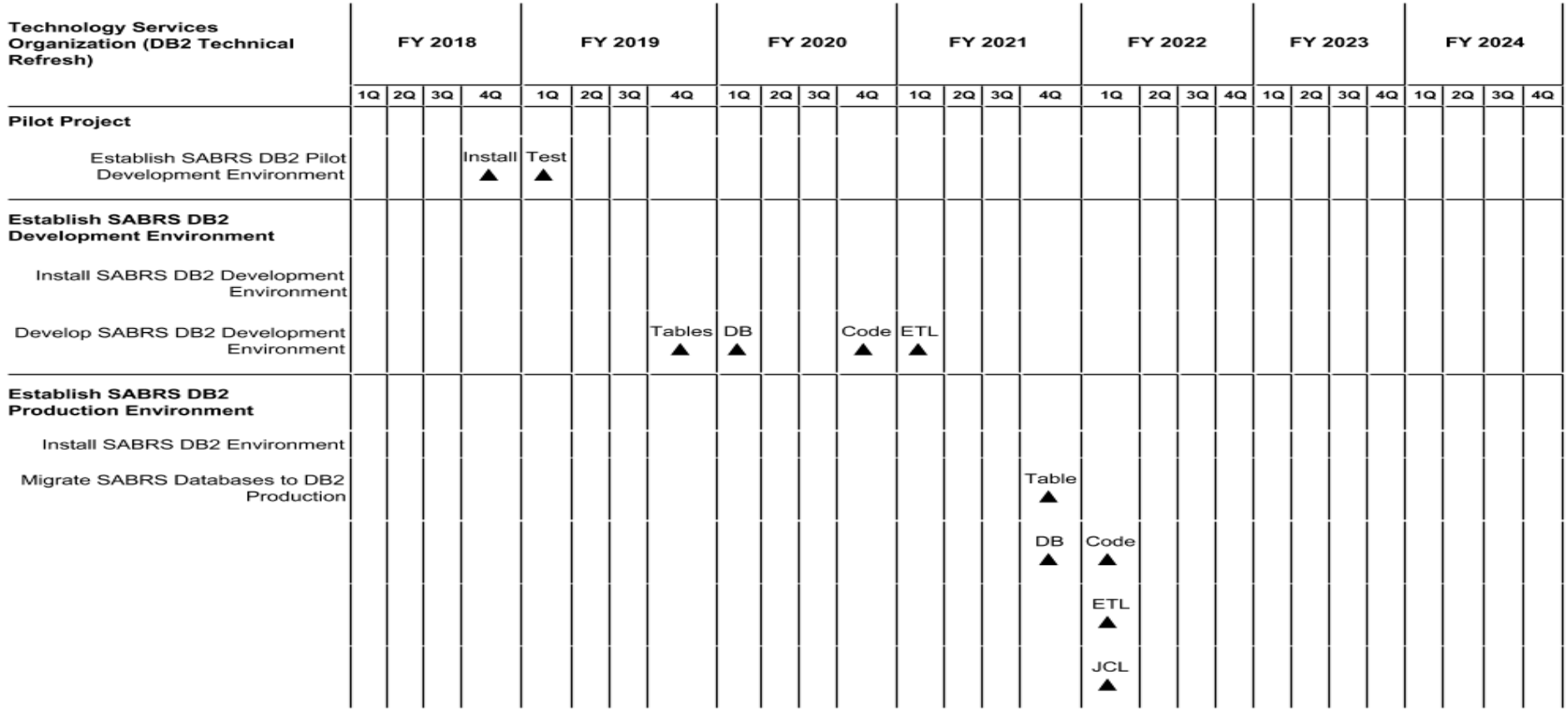
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior Years Cumulative Funding | Various | Various : Various | 12.859 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.859 | - |
| | | **Subtotal** | 12.859 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.859 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 86.212 | 14.497 | | 11.030 | | 1.494 | | - | | 1.494 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

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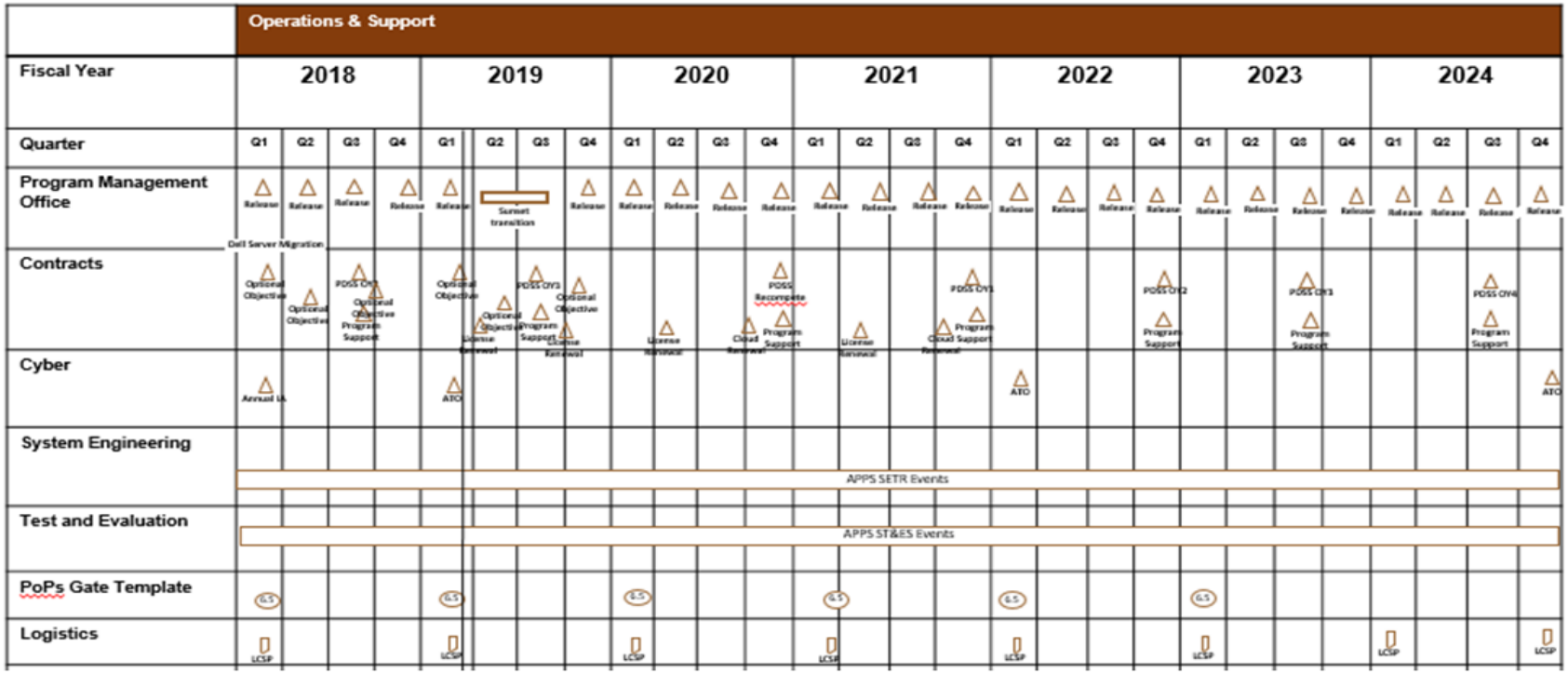
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

## MCRISS Schedule



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|---|---|---|
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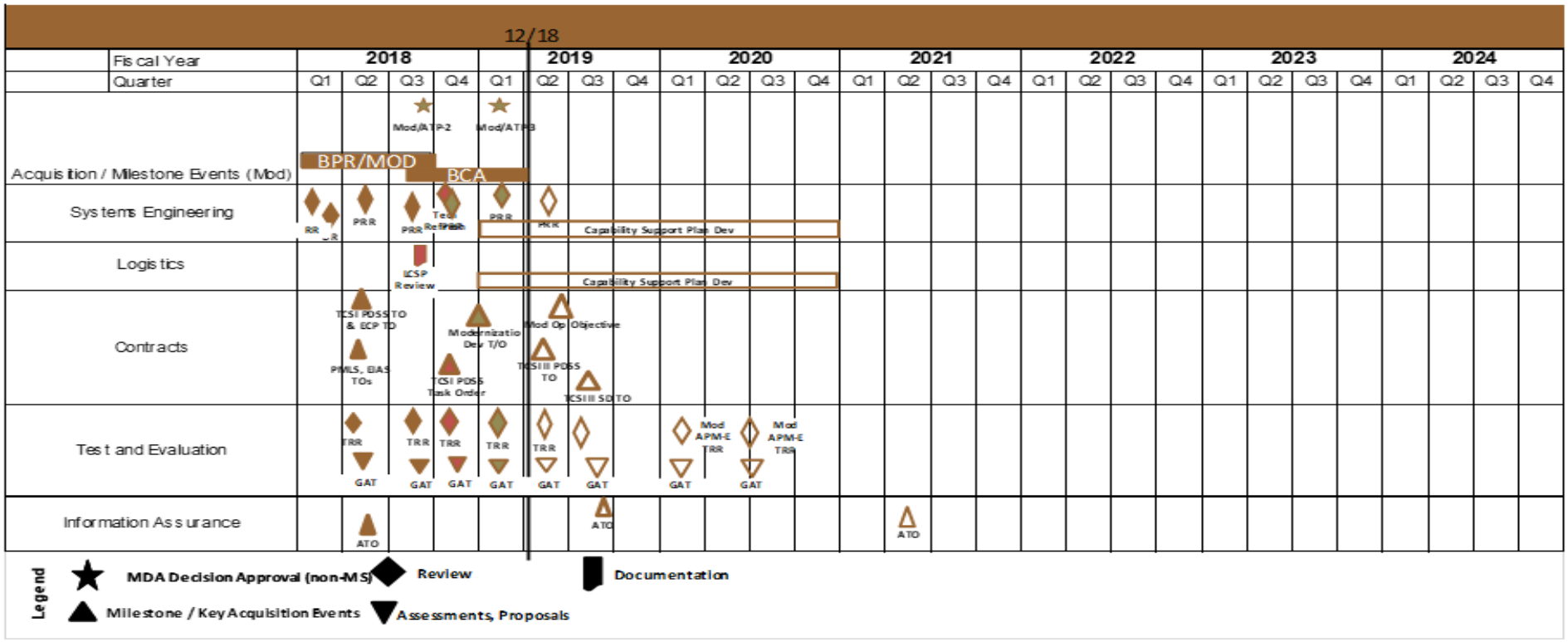
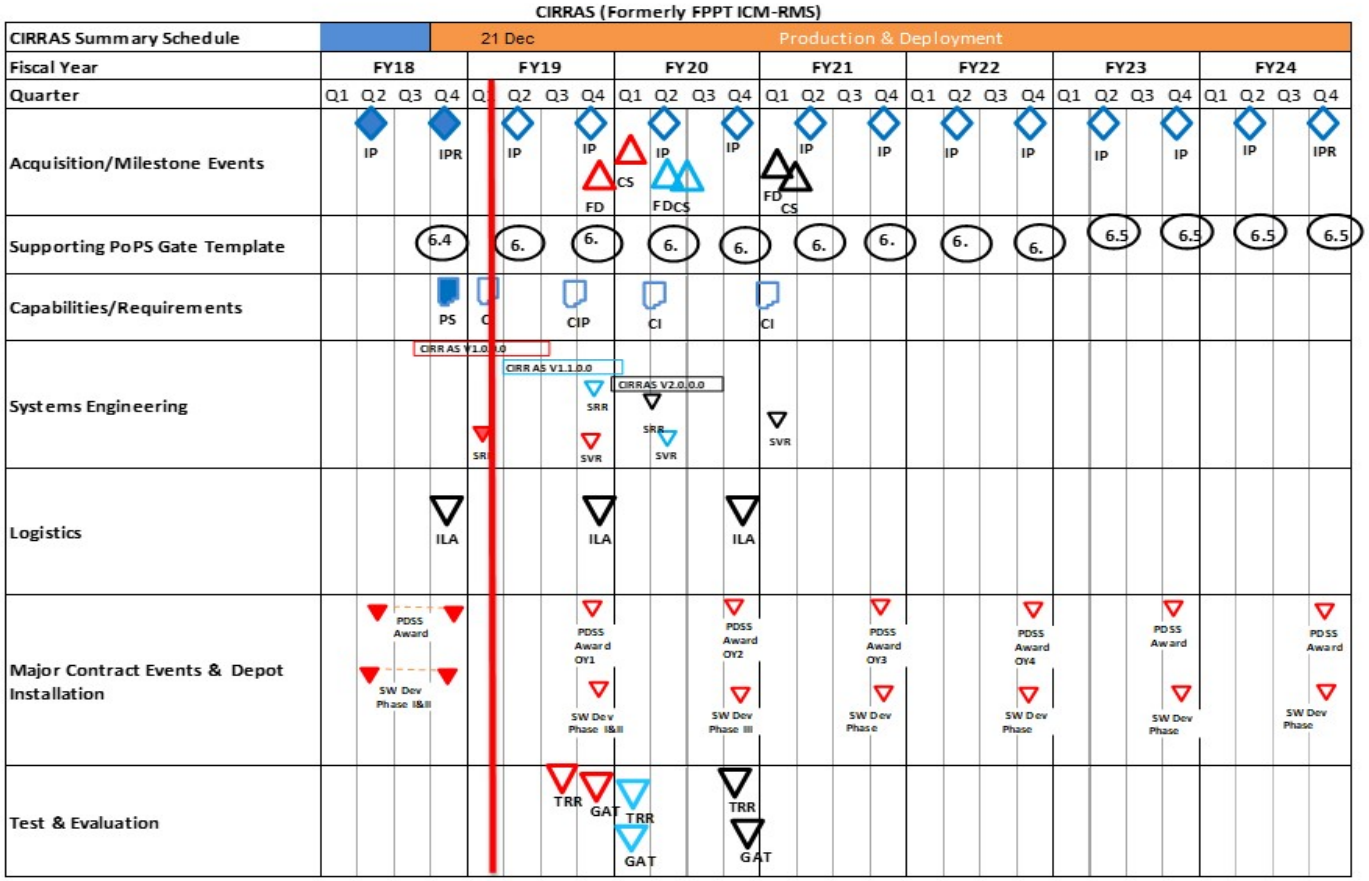
# MOS Schedule

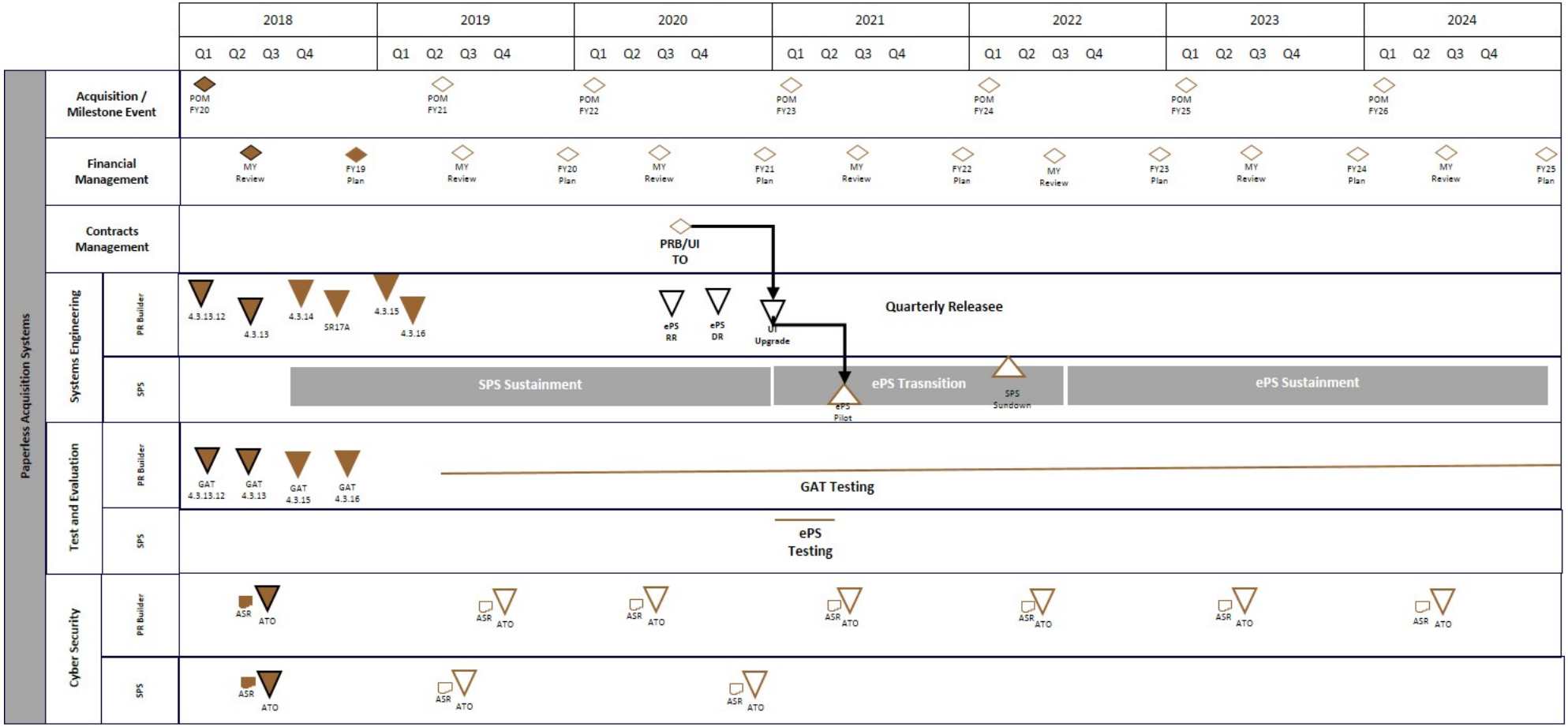


| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

# PA Systems FYDP Timeline



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013M / *Marine Corps IT Dev/Mod* | **Project (Number/Name)**<br>2906 / *Marine Corps IT* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Technology Services Organization (DB2 Technical Refresh)*** | | | | |
| Pilot Project: Establish SABRS DB2 Pilot Development Environment: Install DB2 Pilot on Development Environment | 4 | 2018 | 4 | 2018 |
| Pilot Project: Establish SABRS DB2 Pilot Development Environment: Test DB2 Pilot Environment | 1 | 2019 | 1 | 2019 |
| Establish SABRS DB2 Development Environment: Develop SABRS DB2 Development Environment: Create DB2 Tables | 4 | 2019 | 4 | 2019 |
| Establish SABRS DB2 Development Environment: Develop SABRS DB2 Development Environment: Create DB2 Databases | 1 | 2020 | 1 | 2020 |
| Establish SABRS DB2 Development Environment: Develop SABRS DB2 Development Environment: Convert SABRS Code to work with DB2 | 4 | 2020 | 4 | 2020 |
| Establish SABRS DB2 Development Environment: Develop SABRS DB2 Development Environment: Convert ETL tools to work with DB2 | 1 | 2021 | 1 | 2021 |
| Establish SABRS DB2 Production Environment: Migrate SABRS Databases to DB2 Production: Migrate DB2 table to Production | 4 | 2021 | 4 | 2021 |
| Establish SABRS DB2 Production Environment: Migrate SABRS Databases to DB2 Production: Migrate DB2 databases to Production | 4 | 2021 | 4 | 2021 |
| Establish SABRS DB2 Production Environment: Migrate SABRS Databases to DB2 Production: MIgrate SABRS Code to Production | 1 | 2022 | 1 | 2022 |
| Establish SABRS DB2 Production Environment: Migrate SABRS Databases to DB2 Production: Migrate ETL tools to Production | 1 | 2022 | 1 | 2022 |
| Establish SABRS DB2 Production Environment: Migrate SABRS Databases to DB2 Production: Migrate JCL to Production | 1 | 2022 | 1 | 2022 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605013N *I Information Technology Development* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 425.786 | 120.387 | 242.110 | 384.162 | - | 384.162 | 416.246 | 283.523 | 169.069 | 173.067 | Continuing | Continuing |
| 2901: *AAUSN IT* | 61.225 | 14.017 | 24.491 | 53.248 | - | 53.248 | 47.146 | 34.133 | 1.716 | 1.735 | Continuing | Continuing |
| 2903: *NAVAIR IT* | 14.846 | 10.643 | 19.144 | 19.311 | - | 19.311 | 8.094 | 5.839 | 2.267 | 2.312 | Continuing | Continuing |
| 2904: *NAVSEA IT* | 181.244 | 49.600 | 35.382 | 15.696 | - | 15.696 | 24.813 | 14.701 | 16.134 | 16.457 | Continuing | Continuing |
| 2905: *BUPERS IT* | 82.761 | 24.995 | 89.306 | 167.765 | - | 167.765 | 167.918 | 83.365 | 64.424 | 65.712 | Continuing | Continuing |
| 3167: *Joint Technical Data Integration (JTDI)* | 35.093 | 2.462 | 3.883 | 5.545 | - | 5.545 | 8.178 | 6.233 | 7.211 | 7.989 | Continuing | Continuing |
| 3185: *Joint Airlift Information System (JALIS)* | 2.014 | 0.335 | 0.353 | 0.349 | - | 0.349 | 0.356 | 0.364 | 0.372 | 0.380 | Continuing | Continuing |
| 3432: *NMMES-TR* | 0.000 | 0.000 | 33.049 | 77.351 | - | 77.351 | 119.323 | 122.603 | 54.100 | 55.182 | Continuing | Continuing |
| 3784: *Judge Advocate General (JAG) Enterprise System* | 0.000 | 0.000 | 0.000 | 1.100 | - | 1.100 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.100 |
| 9406: *Maintenance Data Warehouse* | 48.603 | 4.338 | 26.502 | 43.797 | - | 43.797 | 40.418 | 16.285 | 22.845 | 23.300 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 13.997 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.997 |

**A. Mission Description and Budget Item Justification**

2901 AAUSN IT

The FY2020 funding request for RDTEN Project 2901 was reduced by $3.109 million to account for the availability of prior year execution.

FY20 funds transfer out from RDTEN, Information Technology Development (PE 0605013N)-$.685 million to BA04, Administration (4A1M) OMN to align funding for Information Technology (Baseline $0)

DEPARTMENT OF NAVY TASKING RECORDS AND CONSOLIDATED KNOWLEDGE ENTERPRISE REPOSITORY (DoN TRACKER)
Department of the Navy Tasking, Records and Consolidated Knowledge Enterprise Repository (DON TRACKER - formerly known as Enterprise Records and Task Management (ERTM)) is a single, auditable, compliant Records and Task Management process, implemented uniformly across all DON Divisions and Commands, and administered by DON/AA, to enable efficient and effective execution of Records Management (RM) and Task Management (TM) policy in compliance with statute. DoN Tracker deployed in FY18.

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|---|---|
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NMCI ENTERPRISE SERVICE TOOLS (NEST)

The NMCI Enterprise Service Tools (NEST) is the NMCI IT service management system that supports the Navy IT service lifecycle business workflow. NEST includes, the NMCI Enterprise Tool (NET) and the Requirements to Award Process Tool (RAPT), which enables and manages the business workflow. NET is a custom NET application that has been built and maintained by the DON to support ordering of IT services. RAPT manages the requirements approval process and stores supporting documentation for previously un-priced line items. RAPT provides NET with relevant identification information for the new orderable solution, which supports the creation of orderable services. NEST serves as the single point of entry for lifecycle management of IT services on the NMCI network.

The $2.286M decrease from FY19 to FY20 is due to fewer developmental efforts. The FY20 RDTEN being requested, will be used to address minor development requirements after the NGEN-R award; and any changes in DOD/DON procurement policies and mandates.

ELECTRONIC PROCUREMENT SYSTEM (ePS)

ePS provides the Department of the Navy Solution for Electronic Contract Writing replacing the existing Standard Procurement System (SPS) and DoN Integrated Contracting Environment (DICE) capabilities and deficiencies. ePS aligns Contract Writing System (CWS) with Financial Improvement Audit Readiness requirements mandated by Congress and the Department of Navy's goal for an auditable link between financial management and contract writing system. It supports strategic sourcing and seamless exchange of data in addition to evolving to meet changing requirements. The improved capabilities will meet emerging data standards Procurement Data Standards/Procurement Request Data Standards (PDS/PRDS), in addition to complying with Office of the Secretary of Defense (OSD) Clause Logic Service. ePS meets the intent of the National Defense Authorization Act of 2013 by providing an electronic means to award contracts.

FY19 to FY20 funding increase of $31.8M is driven by a significant increase in the ePS user community via Limited Deployment (LD), Release 1 (R1), and Release 2 (R2) activities. LD, began in FY19 and only incorporated 1 full command and 3 small sites for a total of 310 users, with 3 financial interfaces. Release 1 will incorporate 7 full commands (including 42 sites) for a total of 3,644 users. R1 also begins to incorporate Navy specific requirements into the gap closure, software configuration, and testing activities, and includes the development and testing of 6 additional financial interfaces. FY20 includes LD, the majority of R1 activities, and initial data migration planning activities for R2, which is a significantly larger effort.

DONAA IT

The Modernization Initiative includes multiple projects with RDT&E requirements: Multiple Threat Alert Center (MTAC), Data Modernization & Analytical Tools, Knowledge Network (K-Net), Consolidated Law Enforcement Operations Center (CLEOC), and Data Modernization of the Secretariat Automated Resources Management Information System (SARMIS). RDTEN funding will optimize DONAA's capability to make necessary improvements to various Secretariat systems. This modernization will ensure compliance with continued financial emerging requirements. Enhancement of financial auditability will be in compliance with DOD security system requirements.

MULTIPLE THREAT ALERT CENTER (MTAC)

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The Post-Cole Secretary of the Navy Anti-terrorism/Force Protection Task Force identified the need for NCIS to enhance the Multiple Threat Alert Center (MTAC). The MTAC provides key anti-terrorism/force protection products in response to Fleet tasking and is critical to Fleet protection during current Overseas Contingency Operations (OCO). This project provides funding for the development of an IT system to track the movement of NCIS special agents deployed in advance of DoN in-transit units. The ability to track and communicate with these agents is necessary in order to forward threat data to those forward deployed agents and to task them to respond to emerging threats. Funding is required for equipment and contractor support to modify COTS software.

DATA MODERNIZATION & ANALYTICAL TOOLS
NCIS data collection, filtering, and analysis infrastructure is unable to handle the increased flow of terrorism investigative and threat reporting of the Post 9/11 era. NCIS must revitalize its infrastructure and its data and investigation management capabilities to effectively counter current terrorist threats. The three main components of this portfolio investment are data modernization, knowledge management, and investigation management.

KNOWLEDGE NETWORK (K-Net)
K-Net is a Data Modernization & analytical tool being developed and soon deployed that greatly enhances NCIS's technological arsenal. K-Net implements an integrated NCIS approach for identifying, capturing, evaluating, retrieving, and sharing all of NCIS's knowledge and expertise. To that end, K-Net is a knowledge management system that improves NCIS's ability to search, analyze, fuse, and distribute both national intelligence and law enforcement information. The envisioned end state for K-Net is a secure, intuitive, web environment that is the one stop shop where applications, data, and tools are easily accessible to all of NCIS users to effectively and securely fulfill their mission regardless of when and where they operate.

CONSOLIDATED LAW ENFORCEMENT OPERATIONS CENTER (CLEOC)
The Naval Criminal Investigative Service (NCIS) enhancement of CLEOC will enable meeting Law Enforcement (LE) reporting requirements, satisfy Congressional mandates for the Defense Incident-Based Reporting System (DIBRS) and improve functionality across the Naval criminal justice community.

DEPARTMENT OF THE NAVY CRIMINAL JUSTICE INFORMATION SYSTEM (DONCJIS)
The Naval Criminal Investigative Service (NCIS) is the Executive Agent (EA) for the Department of the Navy Criminal Justice Information System (DONCJIS). This system provides a cradle to grave criminal justice and law enforcement information system. The system enables multiple communities within the DON to share criminal justice and law enforcement information. Funding is required for contractor support to develop, test, train, deploy and implement this application.

2903 NAVAIR IT

FY2020 funding request for RDTEN Project 2903 was reduced by $0.525 million due to availability of prior year funds.

Configuration Management System (CMS) - This program was originally identified as Joint Configuration Management Information System (JCMIS) to reflect the main software tool used for component tracking and Aircraft Configuration Management. However, as the available data sources from the fleet have expanded, the new name of CMS was chosen to better acknowledge the variety of information sources which are received, integrated, and compiled to give the most accurate component record

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data and aircraft configuration. CMS serves as the Program of Record (POR) to manage and control Navy and Marine Corps aviation component data reconstruction efforts. CMS compiles record data via fleet documentation of component updates and captures this information via a centrally managed database within the current software tool, Joint Configuration Management Information System (JCMIS). CMS efficiently manages product structure data, including complex interrelationships between assemblies and subassemblies, technical documentation and the parts that comprise the item. Accurate, complete and accessible configuration data is critical to the successful operations of DoD weapon systems or tracked assets. Mission readiness and operational capabilities are enhanced by CMS, as consistent integrated configuration data is readily available to operators, maintainers and logistics personnel. CMS provides users with a common database infrastructure to ensure compatibility, quality, and consistency of Configuration Management (CM) processes and provides configuration managers and analysts the validated CM information necessary for accurate maintenance, spare procurements, reliability and safety analysis, and mission readiness. Funding is budgeted to support the services of re-hosting and testing of Commercial off-the-shelf (COTS) upgrades to ensure objective performance of CMS is achieved.

Navy Cybersecurity - Cyber Warfare consists of many different aspects to include sabotage of our weapon systems, networks as well as enablement of missions. Nation and non-nation state actors are acquiring and employing more advanced cyber-attacks in order to exploit our networks and aviation systems challenging our technological edge. The threats and capabilities are real and range from exploiting capabilities, overloading weapons systems and logistics supply chains, to jamming signals or taking control of weapons systems. We must defend against adversarial cyber attacks while contributing to the exploitation of cyber warfare capabilities.

To meet these challenges and address the Chief of Naval Operations priorities and tasking, these R&D efforts are specifically focused on Naval Air Systems Command weapon or control systems and programs to ensure warfighting effectiveness as part of integrated / multi-platform kill chains. These research and development efforts will strengthen our cyber posture by developing research, development, test and evaluation capabilities and solutions to deter, detect, and mitigate cyber threats and safeguard classified naval aviation systems and platforms from "cradle to grave." These solutions will be integrated into the acquisition of weapons systems to enhance security, increase lethality, and improve resiliency in the expected operational environments. Our weapon or control systems are unique in the aforementioned environments and mission, but also in the presence of numerous non-traditional access points and trusted cyber relationships required for operational environments.

Digital Thread (DT) - capability provides digital process integration with complete, secure and authoritative data. DT integrates the product life cycle, and includes all the processes that are needed to design, develop, test, produce, and support a product. Connecting these processes using standardized digital tools and data accelerates the product development cycle and lowers costs for support and new capability integration. The Digital Thread capability includes development and demonstration of cyber security architectures for sustainment information systems, and development of a digital manufacturing data architecture and repository.

2904 NAVSEA IT

FY2020 funding request for RDTEN Project 2904 was reduced by $6.917 million due to availability of prior year funds.

This program includes the funding for Information Technology (IT) support at NAVSEA for the development, support, and sustainment of maritime shore maintenance and includes multiple modernization efforts to insure effectiveness of Fleet maintenance systems as part of the current Navy Maritime Maintenance Enterprise Solution (NMMES). These efforts include retirement and/or replacement of costly legacy systems, transition planning and systems engineering for integration with national and enterprise interim and future solutions. These efforts align with direction to insure that proposed interim solutions support a planned, single maintenance solution

end state, as well as direction to align with data center consolidation plans proposed across the FYDP. It includes the modernization of Naval Shipyard and Regional Maintenance Centers' Maintenance, Repair and Overhaul (MRO) production tools. This includes modifications/enhancements to Shipyard IT systems, such as Advanced Industrial Management (AIM); Project Scheduling and Sequencing (PSS); Workload and Performance Systems; the COST and MAT systems, and other solutions such as the Electronic Technical Working Document (eTWD) Initiative. The goal of PMO-IT is to provide modernization, migration and consolidation of obsolete legacy systems to the next generation of centrally hosted tools supporting Fleet Maintenance and national systems for the Navy.

2905 BUPERS IT

FY2020 funding request for RDTEN Project 2905 was reduced by $2.200 million due to availability of prior year funds.

Research and Development Funds for MPT&E Transformation under PE 0604703N have been consolidated within PE 0605013N PU 2905 starting in FY19.

This effort is the linchpin of the Navy's MPT&E (Manpower, Personnel, Training & Education) business IT Transformation strategy which stems from the decision to invest in programs that directly align with the Sailor 2025 vision. The current 70-year-old business processes and 40-year-old obsolete IT systems will not sustain Fleet anticipated growth and is not cost efficient nor effective. The Transformation strategy involves revolutionary change by rapid implementation of MPT&E business IT products using the Industry Best Practices Model (e.g., early investment for largest ROI, rapid prototyping, and vanilla COTS products usage.) Four projects are the cornerstones of the N1 Transformation strategy. The Navy Standard Integrated Personnel System (NSIPS) will become Navy Personnel and Pay (NP2) and includes personnel and pay modernization and the collapse of Legacy Manpower System functionality. Second, a Single Point of Entry (SPOE) for Sailor self-service is composed of My Navy Portal (MNP), Identity and Access Management (IdAM), a Customer Relations Management (CRM) solution, and a centralized and standardized customer service center (The My Navy Career Center (MNCC)). Third, MPT&E Core Learning Stack improves the accessibility, sophistication, and collaborative nature of educational outreach. Finally, the Authoritative Data Environment (ADE) will enable the collapse of 9 legacy data warehouses into a single, authoritative source of truth for Sailors and Navy decision makers. Additionally, ADE will enable modern data analytics and business intelligence capabilities, taking advantage of current state of practice cloud services, to be leveraged in addressing the Navy's current challenges.

In FY20, there is significant investment being made to increase the scope and scale of Single Point of Entry/My Navy Portal which will provide the Sailor with a self-service web environment. SPOE efforts in FY20 will include development of transactional mobile applications, Identity and Access Management (IdAM) solution, and MNP integration with My Navy Career Center (MNCC). In parallel, there is an increase scope for NP2 in the ramp up to a MPT&E Navy Personnel and Pay (NP2) system. Transformation field test activities which began in FY18 will continue to build out, as well as prototypes, testing, integration, and migration to the cloud environment.

NAVY PERSONNEL AND PAY (NP2) - The NP2 increase in FY20 supports the de-customization of the Navy Standard Integrated Personnel System (NSIPS) and integration of Direct to Treasury Pay Capability via Pay Modernization (Pay Mod). This combined effort (named NP2) will result in an integrated, vanilla Commercial Off the Shelf, cloud hosted, integrated personnel and pay solution that will provide the navy with an IT system that is modern, highly automated, auditable, and more efficient. FY20 efforts include:

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1. Complete end-to-end Application Functional Testing (AFT) for the NP2 Rapid Prototype Pilot (RPP).
2. Complete Compile to Combat engagement & experimentation activities for NP2 RPP.
3. Complete first capability drop for NP2 RPP (Street to Fleet functionality).
4. Begin Rapid Fielding Pilot (RFP) #1, the scope of which will include Personnel Administration, Benefits and Pay for "Fleet to Retirement/Separation", including afloat capability.
5. Complete Transition Plan for movement of NP2 to the commercial cloud environment.
6. Complete transition of NP2 from Government Cloud to the commercial cloud environment.
7. Complete Defense Joint Military System (DJMS) data cleansing in support of transition of Pay functionality to NP2.
8. Conduct deployment planning for NP2 RFP.
9. Conduct design and development sprints for NP2 RFP #1.
10. Conduct SRR/SFR, PDR, CDR, and iterative AFT/ASIT for NP2 RFP #1.
11. Begin planning activities for NP2 RFP #2, the scope of which will include Position Management, Task Analysis, and Manpower Requirements analysis.

A 2015 analysis of alternatives for integration of personnel and pay capabilities recommended the use of Oracle PeopleSoft 9.2 with Global Payroll for achieving the Navy's Personnel and Pay IT needs. Follow-on analysis conducted as part of the MPT&E transformation efforts in 2016 and 2017 indicated that the most cost effective approach to achieving the Transformation goals of modernizing HR Business System IT consistent with industry best practices was de-customization of the Navy Standard Integrated Personnel System (NSIPS) which uses Oracle PeopleSoft as its core technology, integration with Global Payroll, use of General Ledger to maximize auditability and accounting functions and hosting of the integrated solution. This combined effort (named NP2) will result in an integrated, vanilla Commercial Off the Shelf, cloud hosted, integrated personnel and pay solution that will provide the navy with an IT system that is modern, highly automated, auditable, and more efficient.

Implementation of NP2 will result in several key benefits:

1. Improved accuracy and auditability of personnel and pay transactions.
2. Treasury Direct Disbursing eliminating Navy reliance on the sunsetting DJMS system.
3. Improved permeability of Active and Reserve Components to improve accuracy and eliminate delays in pay processing when a member moves between components.
4. Increased automation of common personnel and pay transactions
5. Integration of functionality currently spread across 55 different adhoc and outdated HR Business Systems.

Efforts in FY20 are focused on system development, testing and delivery of core components associated with Military Pay, Personnel Transactions that effect Pay, Auditability, Accounting, and Treasury Direct Disbursement. Beyond F20, development will continue and will bring continued integration of legacy systems such as those used for detailing and distribution, management of Sailor performance, and talent management and matching.
Beginning in FY20 system requirements and functionality for NMRS/BBD/AoA will be subsumed under the auspices of NP2 as part of the N1 MPT&E Transformation and system consolidation. The descriptions for those systems are provided below.

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BILLET BASED DISTRIBUTION (BBD)
BBD is a Sailor 2025 initiative aimed at modernizing distribution and order writing systems. The effort begins functional work and follow-on development to collapse Navy Reserve Order Writing System (NROWS), Navy Marine Corps Mobilization Processing System (NMCMPS), Enlisted Assignment Information System (EAIS), and Officer Assignment Information System (OAIS) into a single distribution system. The objective of BBD is to increase personnel readiness, improve fit and provide clear visibility to the impact on mission readiness at the billet level. BBD will facilitate maximizing the contributions of every member of the Navy workforce by delivering competency-based career paths. As part of the Navy's transformation initiative, BBD will be consolidated into the MPT&E Personnel and Pay System technology component.

NAVY MANPOWER REQUIREMENTS SYSTEM (NMRS)
NMRS will modernize obsolete software and incorporate a wide array of enhancements (expanded capabilities based on sponsor's approved Functional Requirements Document) of new capabilities in support of Manpower Requirement efficiencies. NMRS is a key tool which Navy manpower managers rely on to set, implement, and execute manpower requirements. Recommendations for improving data bases and the Navy's mobilization capacity rely on NMRS to make strength determinations. The planned effort also includes technical evaluation and integration of products produced by the Simulation Toolset for Analysis of Mission, Personnel and Systems (STAMPS) program. As envisioned by the Navy's Transformation initiative, NMRS will eventually be consolidated into the MPT&E Personnel and Pay System technology component of the transformation.

ANALYSIS OF ALTERNATIVE/ECONOMIC ANALYSIS (AOA)
The Navy will conduct multiple AoAs and studies to analyze viable alternatives in order to determine the most efficient and effective solution to address the modernization of elements of the Navy's Manpower, Personnel, Training and Education (MPT&E) IT portfolio. AOA will assess operational effectiveness, suitability, and costs of non-tactical systems to meet emerging capability requirements.

LEARNING STACK (FORMERLY LEARNING MANAGEMENT SYSTEM - DISTANCE LEARNING (LMS-DL))
Beginning in FY20, LMS-DL is aligned with the Learning Stack (LS) technology component of the N1 Transformation initiative. LMS-DL supports ready relevant learning, with a focus to align Navy learning, create a career learning continuum, and leverage evolving technologies to expand learning solutions when and where the Sailor needs them. The collaborative learning environment (CLE) is a key component within the learning IT strategy that leverages Commercial-Off-the-Shelf products to integrate the CLE with intelligent tutors, a multi-purpose reconfigurable training system (MRTS), electronic classrooms (ECR), trainers and labs, interactive multimedia instruction (IMI), instructors, and a virtual environment.

As part of the Transformation holistic IT approach, ready & relevant learning requires the development of a Learning Management System that permits:
(1) Mobile & flexible delivery of modular training to the sailor
(2) Synchronization of work requirements with learning modules to ensure proper training is delivered at the right time

FY20 funding will develop and deploy new technologies for modularized training in fleet concentration areas to support the continuum of learning to include:
(1) Development, modification or replacement of the current LMS platform

(2) Integration of Manpower, Personnel, Training and Education (MPTE) management tools to support end to end business processes (billet information, assignment, distribution, student management, learning management, personnel information, advancement) that will be impacted by changes to learning delivery and career profiles via Progressive NECs (e.g. Legacy systems: TFMMS,NSIPS, Learning Assessment System, Navy Training Management Planning System and future transformation systems: NP2 and ADE.)

The Learning Management tools and supporting IT infrastructure must also be modified to support management of training into the Delayed Entry Program, the growing use of demonstration videos, social media, student and learning management for MPTE mobility efforts, gaming and simulation technology as it is brought on-line. LMS-DL will also introduce the Learning Continuum Pilot, a risk reduction effort that develops proof of concept alignment of sailor training requirements with learning content delivery.

SINGLE POINT OF ENTRY (SPOE) (FORMERLY MY NAVY PORTAL (MNP))
MNP is aligned with the single point of entry (SPOE) technology component of the N1 Transformation initiative. MNP is an integrated web portal that consolidates the Navy's Human Resource portals, knowledge, and applications into a single and simplified user experience. Through the use of a multi-phased development approach, MNP will provide an intuitive self-service single point of entry (SPOE) for Sailors to view and manage their personnel and career information. MNP provides Active and Reserve Sailors with personalized interactive experiences and allows access to relevant information including learning content, human resource applications, and career business processes.
Beginning in FY20 system requirements and functionality for ARM will be subsumed under the auspices of SPOE as part of the N1 MPT&E Transformation and system consolidation. The descriptions for the system is provided below.

APPLICANT RELATIONSHIP MANAGEMENT (ARM)
ARM provides automated support of the management of recruiting information. ARM enables all levels of recruiting to have real-time access to timely and accurate information. ARM provides managers with decision-making support by consolidating Navy Recruiting Command (NRC) legacy application systems. The complete ARM Systems Dev/Mod effort will incorporate biometrics and paperless implementation across all lines of business systems to gain additional efficiencies. Included in the ARM program is the Self Service Accessions Application (SSAA). Phase II of this effort will build the SSAA application into the ARM system. SSAA is a mobile device-based software application. SSAA supports a change in the NRC business processes from a recruiter-driven business model to an applicant self-service business model. This "app" will be used by applicants to collaborate with recruiters anytime & anywhere to more efficiently and effectively navigate the recruiting process. As envisioned by the Navy's Transformation initiative, ARM will be consolidated into the SPOE Customer Relations Management (CRM) in FY20.

AUTHORITATIVE DATA ENVIRONMENT (ADE)
ADE is part of the Navy's MPT&E IT Transformation initiative aligned directly with the Authoritative Data Environment technology component of the transformation. ADE is aimed at transitioning the current project based ADE into a full enterprise solution that is based on modern IT service models and cloud hosting technology. This will advance data analytics and visualization capabilities, and add common platform services in a big data environment that is consistent with private industry. This acceleration toward a true Navy-wide personnel authoritative data environment is a transformational increase in capability for decision support and improving personnel readiness.

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As part of the Transformation strategy, the Chief of Naval Personnel has directed expansion and improvements of the ADE in making MPT&E data more available to commanders, sailors, business owners and fleet executive leadership. The ADE provides infrastructure, operations and sustainment of the Navy MPT&E Authoritative Data Warehouse(ADW), enterprise service bus, and web support services.
The capabilities delivered by this funding include:
(1) Completed "golden record" expansion increments
- Data quality
- Governance
- Security
- Data standardization

(2) Increased capabilities for MPT&E supply chain & business operations
- Data discovery
- Advanced visualization tools
- Predictive analytics

(3) Enhanced architecture to support unstructured data and "big data" analytics
(4) Improved support for future identity management & access for mobile device capability

RISK MANAGEMENT INFORMATION (RMI)
The RMI program is a consolidation of DON risk management requirements into a single Program of Record (POR) to provide modern safety reporting and management capabilities for both active and reserve Navy and Marine Corps commands. RMI enables agile responses to business rule changes, automation of routine actions, improved data integrity, and facilitates self-service for organizations and individuals.

RMI is being developed in three increments of capabilities: Streamlined Incident Reporting (SIR), Safety Program Management (SPM), and Analysis & Dissemination (A&D). A fourth requirement, Portal integration, will be accomplished as part of the development of the three RMI increments since each will be built on the same Commercial Off The Shelf (COTS) platform. Each of these capabilities will be acquired as individual Abbreviated Acquisition Programs using an incremental development approach for reengineered business processes, while consolidating five legacy systems Web-Enabled Safety System (WESS), Enterprise Safety Application Management Systems (ESAMS), Portsmouth Occupational Accident and Illness Reporting System (POAIRS), Medical Mishap and Compensation (MMAC), and Injury Tracker (INJTRK).

3167 JOINT TECHNICAL DATA INTEGRATION (JTDI)

JOINT TECHNICAL DATA INTEGRATION (JTDI)
Joint Technical Data Integration (JTDI) Program - JTDI funding supports the evaluation, testing and integration to develop a JTDI Government Off-The-Shelf (GOTS) solution for installation on Carrier and Amphibious Assault class ships and at other globally deployed Navy/Marine Corp aviation activities. JTDI is a digital technical data access, delivery and local Organizational & Intermediate level library management toolset. It improves accuracy and timeliness of technical manual and other

technical data delivery and minimizes the Fleet's library management burden. JTDI reduces maintenance work hours with a savings Return on Investment of 2.5:1. JTDI also provides deployed maintenance personnel with 24x7 collaborative reach-back/tele-maintenance capabilities so that Fleet Support Teams/Engineering Technical Services can remotely diagnose problems and assist with repairs, and provides for process efficiencies to support ongoing Aviation Fleet Technical Representative reductions.

MARINE AVIATION LOGISTICS ENTERPRISE INFORMATION TECHNOLOGY (MAL-EIT)
Increased funding to accelerate the deployment of MAL-EIT 3.0 to meet the new deadline of FOC in FY19 as well as begin development of MAL-EIT 3.1.
Funding supports the evaluation, development, testing and integration of software and hardware solutions across all US Marine Corps Aviation activities to be used in the planning and execution of geographically distributed, expeditionary Aviation Logistics (AVLOG) chains in support of deployed USMC Air Combat Element operations. The Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) Program is one of four programs contained within the Marine Aviation Logistics Support Program (MALSP) modernization program known as MALSP II. Legacy MALSP is nearly 25 years old and grossly inadequate in IT capability to meet the informational, planning, and C2 needs of a dynamic, geographically distributed nodal AVLOG system. MAL-EIT is a Defense Business System Abbreviated Acquisition Program that will develop and deliver the required IT capability necessary to eliminate the IT related gaps existing in the legacy MALSP.

3185 JOINT AIR LOGISTIC INFORMATION SYSTEM (JALIS)

JALIS is an operational scheduling and aircraft management system that facilitates real-time data analysis. JALIS is a critical element in the management of DoD air logistics assets. JALIS allows:

(1) DoD Service Personnel to submit airlift requirements for DoD Personnel and cargo
(2) Air Logistics Flying Units to communicate their aircraft availability in a real-time graphic display
(3) Designated Scheduling Organizations to compare airlift requirements with available aircraft
(4) Designated Scheduling Organizations to create mission assignments

JALIS informs applicable users of mission details and modifications by using a combination of system displays and email updates. JALIS is geographically distributed and has a user base in excess of 4,000 members. JALIS facilitates the movement of thousands of DoD Personnel and tons of cargo annually in support of the following:

(1) Navy Unique Fleet Essential Airlift
(2) Army's Operational Support Airlift Agency (OSAA)
(3) United States Transportation Command (USTRANSCOM)
(4) United States Marine Corps (USMC)

3432 NMMES-TR

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The NMMES-TR is an Information Technology (IT) acquisition program that will provide a sustainable enterprise IT solution leveraging Commercial, Off-The-Shelf (COTS) technology and business processes for shore maritime maintenance. Unlike the uniquely custom designed status quo toolset, the NMMES-TR solution will not implement extensive product customization to match the current maintenance business processes; but rather, maintenance business processes will be modified to match the software solution, thereby adopting industry best practices. Accordingly, the solution will be more flexible to the BPR process, and more agile to capitalize on efficiency improvement opportunities and innovations. This will facilitate alignment with the Optimized Fleet Response Plan (OFRP) by assisting the maintenance activities with accomplishing assigned tasks as planned in order that submarines, aircraft carriers, and surface ships can properly train and deploy on schedule. NMMES-TR will also provide a modern solution that will be more effective and efficient in combating cybersecurity threats, and capable of continuous monitoring.

The NMMES-TR initiative has been a pre-acquisition Defense Business System (DBS) effort for the past three years funded through Line Item 0605013N, Project Number 2904. In April 2017, the Department approved the NMMES-TR initiative to commence as an acquisition program, resulting in the establishment of a new Project Number 3432 beginning in FY19.

9406 MAINTENANCE DATA WAREHOUSE

FY2020 funding request for RDTEN Project 9406 was reduced by $0.398 million due to availability of prior year funds.

Maintenance Data Warehouse funds the Naval Aviation Enterprise (NAE) Sustainment Vision (SV) 2020 digital transformation which is a critical component of improving readiness. It will be executed in a fully agile manner providing continuous fleet readiness improvements across the FYDP. The initial SV 2020 configuration will be supported with an agile Minimal Viable Product (MVP) as the foundation for continuous capability introduction. The Aviation Logistics Environment (ALE) will provide the seamless environment to support the integration of the other capabilities developed in Maintenance Data Warehouse.

Aviation Data Warehouse/Decision Knowledge Programming for Logistics Analysis and Technical Evaluation (DECKPLATE) program is the next generation data warehouse containing over 30 years of aircraft maintenance, flight, components, and usage data. Through the use of web-based, commercial off the shelf software for data load, analysis, query, and reporting tools, the user has the capabilities to effectively obtain readiness data in a near real-time environment, as well as providing historical data for long range planning, trend and records analysis, records reconstruction, and compliance with technical directives. DECKPLATE supports the mission of the warfighter who requires a single source of near real-time aviation data in which to base critical readiness decisions. DECKPLATE collects data from authoritative sources, such as the fleet maintenance systems, into a data warehouse. Because the warfighter only needs to access one database, the time consuming task of collecting various pieces of data from various sources will be reduced and ultimately eliminated. This also accomplishes a reduction in legacy systems mandated by Office of the Chief of Naval Operations. DECKPLATE manages total inventory for two major categories of assets, Aircraft (General Equipment) and Engine/Propulsion Systems/Modules (EPSMs) (Operating Materials & Supply). DECKPLATE is comprised of the transactional Aircraft Inventory and Readiness Reporting (DECK-AIRRS) and the Engine Transaction Reporting (DECK-ETR) subsystems which provide the complete lifecycle for aircraft and Engine/ Propulsion System/Modules (EPSMs). DECKPLATE has been identified as a level 1 financial feeder system due to the value of the aircraft and EPSM's managed in the system, and continues to respond to audit compliance and Cyber Security mandates. DECKPLATE is a core feeder system to numerous NAVAIR efforts.

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Condition Based Maintenance Plus (CBM+) solution is an initiative which provides Naval Aviation Enterprise with common enabling capabilities which deliver timely data-driven, decisional information to optimize aircraft availability and materiel readiness by incorporating health and usage leading indicators into the failure mode mitigation process, enabling the Warfighter to more efficiently meet mission requirements through automated analysis and decision making processes. The CBM+ initiative increases readiness through streamlined maintenance processes which provide the sustainment base with timely, actionable logistics/engineering data and integrated analytics not previously available, enabling engineers and acquisition professionals to support system improvements based on CBM+ acquired data and analytic results. CBM+ provides the enabling infrastructure and storage solutions within an Enterprise common environment needed to store and analyze weapon system sensor data to extend the life of current and new acquisition aircraft, realizing savings from reductions in field (organizational and intermediate) maintenance actions, reduced functional check flight hours, mishap mitigation, and reduced parts usage.

The Aviation Logistics Environment (ALE) program is the Naval Aviation Information Technology (IT) solution to deliver full lifecycle weapon system logistics and maintenance capabilities to the functional Naval Aviation Support Process (NASP). ALE will provide a seamless digital environment that will improve readiness and provide for reduced system development, testing, deployment, and sustainment costs, as well as reduced cyber risk due to lower number of IT systems and ability to address capability gaps via an integrated technology schedule. It will deliver these capabilities via a net centric, shared data environment that supports shore based, afloat, and expeditionary operations. The ALE integrates IT services plane-side and interfaces with infrastructure systems where necessary. ALE is a global logistics enterprise solution and a part of the total enterprise solution architecture. ALE is designed to structure IT services with the ability to connect with other parts of the enterprise solution set, thus enabling an interoperable end-to-end business process. ALE consolidates Naval Aviation data into an integrated data environment for high level analysis. ALE will integrate, organize, and develop an underlying infrastructure and analytical capacity across the NASP in order to generate a holistic timely picture of readiness and condition for all T/M/S. ALE will be providing modern Product Lifecycle Management (PLM), Decision Support (Predictive Analytics), Planeside Interfacing, and the Enterprise Infrastructure to support the NAE. The ALE program is a "system of systems" that will provide a common, integrated data environment that will enable NAE Vision 2020 data transparency across the Naval Aviation Enterprise; end-to-end process view to enable both consuming and providing on-demand information to stakeholders; a capability to view "digital twins" of all T/M/S for both allowable and as- configured states; a consolidation of aging, near-end-of-life systems and applications to modern technology and cost efficient support infrastructures; consistent and accurate weapons systems technical and Computer Aided Design (CAD) engineering documentation to support additive manufacturing capabilities; standardized metrics, algorithms, and business analysis tools; an architecture that enables migration to the cloud; and alignment to Information Assurance (IA) and Cybersecurity standards, and Risk Management Framework (RMF) compliance.

Vector (formally Integrated Logistics Management System (ILSMS)) supports the development of a common logistics analytical application which uses a disciplined approach to Business Intelligence (BI) architecture by combining products, data, technology and methods aimed at key Naval Aviation Enterprise (NAE) business processes. Vector provides a single view of the data to focus on aircraft readiness, maintenance, supply, cost, and man-hours. Vector provides naval aviation with a common view of approved key performance metrics and the capability to perform multi-system analysis of Ready for Tasking (RFT)/Ready Basic Aircraft (RBA) Gap drivers, 'Top-Down' aircraft systems analysis down to the component level. Vector identifies system performance trends early to mitigate future readiness and cost impacts to the fleet.

- Dynamic Scheduling optimizes aircraft (BuNo specific), engine and component maintenance through task sequencing based on reliability and failure data, and asset utilization vice calendar directed maintenance. Dynamic Scheduling will have insight to demand across the NAE and can affect maintenance across all levels

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of maintenance. Dynamic Scheduling IT system capability will interface with authoritative source systems providing and consuming operational demand, man power, training, supply and others. Near term Dynamic Scheduling capability is planned for NALCOMIS OOMA and future state DS capability is planned for NAMS implementation. Both material and non-material changes implemented along with the DS IT system will provide capability that overcomes the challenges faced by the as-is state to include: Advanced scheduling capabilities interfaced with current future MRO system to enable system assisted scheduling, optimization and opportunistic maintenance.
- Insight and the ability to collaborate and affect schedules across all levels of maintenance and MRO systems.
- Capture and analysis of RCM mitigations strategies with the ability to quickly implement changes to maintenance tasks and periodicities.
- The ability to package Technical Manuals for serial number specific, scheduled event tasks at the point of maintenance.
- The ability to provide additional point of maintenance technical data and support to enable the maintainer of the future.

Optimized Scheduled Maintenance and Dynamic Scheduling IT system capabilities will contribute to the reduction of MMHs and increase in operational availability objectives by positively affecting the efficiency of maintenance at the O, I & D-Levels of maintenance across the NAE. Future state OSM IT system capability may be provided by the Aviation Logistics Environment (ALE)/Product Lifecycle Management (PLM) solutions. Dynamic Scheduling IT capability is schedule to be developed as an interface to NALCOMIS OOMA in FY 19 timeframe. Future state version of Dynamic Scheduling IT capability will interoperate with Naval Aviation Maintenance System (NAMS) and other future state system such as Naval Data Repository (NDR), ALE/PLM, and Navy Depot Management System (NDMS).

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 152.977 | 268.567 | 375.700 | - | 375.700 |
| Current President's Budget | 120.387 | 242.110 | 384.162 | - | 384.162 |
| Total Adjustments | -32.590 | -26.457 | 8.462 | - | 8.462 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -36.457 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 10.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -4.321 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 8.538 | - | 8.538 |
| • Rate/Misc Adjustments | 0.002 | 0.000 | -0.076 | - | -0.076 |
| • Congressional Directed Reductions Adjustments | -42.771 | - | - | - | - |
| • Congressional Add Adjustments | 14.500 | - | - | - | - |

**Congressional Add Details ($ in Millions, and Includes General Reductions)**

| | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |

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| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| Congressional Add: *Enterprise Condition Based Maintenance* | 4.346 | 0.000 |
| Congressional Add: *Enterprise Product Lifecycle Management* | 9.651 | 0.000 |
| Congressional Add: *Advanced Radar Condition Based Maintenance* | 0.000 | 10.000 |
| Congressional Add Subtotals for Project: 9999 | 13.997 | 10.000 |
| Congressional Add Totals for all Projects | 13.997 | 10.000 |

**Change Summary Explanation**

The FY2020 funding request for PE0605013N / Information Technology Development was reduced by $13.149 million to account for the availability of prior year execution balances.

Technical: Not applicable.

Schedule:
Project 3167 - In order to comply with Federal and DoD data center consolidation and virtualization requirements, JTDI top-tier was transitioned from Army Redstone Arsenal (RSA) and is now hosted at Defense Information Systems Agency (DISA) Defense Enterprise Computing Center (DECC) in Mechanicsburg, PA. The annual release cycle typically used by the JTDI program was insufficient to deal with the technical and programmatic complexity required to move JTDI top-tier operations from RSA to DISA DECC. A transitional baseline release (JTDI Version 2.0.5.0) requiring a longer system development cycle was needed to integrate JTDI into the DISA computing environment, make adjustments to contracts, and negotiate service level agreement, terms and conditions, and pricing arrangements with DISA.

Project 3432 - The program office conducted a review of the schedule in response to the 19 month schedule risk identified by NCCA during the Gate 4 Cost Review Board (CRB) and formalized in the approved Component Cost Position (CCP) dated 12 Apr 2018. After careful review of the scheduled activities, the timeline for Increment 1 and the total program were increased by a combined total of 14 months to mitigate the stated risk.

Project 9406 - Due to a FY19 Congressional Mark VECTOR and Dynamic Scheduling schedules have been pushed 12 months.

Funding: Changes addressed within individual projects.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | | | | Project (Number/Name)<br>2901 / *AAUSN IT* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2901: *AAUSN IT* | 61.225 | 14.017 | 24.491 | 53.248 | - | 53.248 | 47.146 | 34.133 | 1.716 | 1.735 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

DON/AA IT Modernization (formerly AA USN IT)

SYSTEM MODERNIZATION & ANALYTICAL TOOLS: The Secretariat Automated Resources Management Information System (SARMIS) is a financial tool used by the Secretariat to formulate, execute, and report changes to organizational resources. DON/AA employs this system to support financial and resource decisions for all Secretariat activities. SARMIS produces budget materials and analysis, as well as generating allocation data. In addition, SARMIS contains organizational manpower data that assists our leaders in making necessary personnel decisions for the Secretariat. The SARMIS application is currently operating on a severely outdated and underperforming platform. This results in additional administrative overhead, error corrections, and development fixes to maintain current operations. This RDTEN funding is used to upgrade this critical software capability to a new platform, comply with mandatory DOD cyber security requirements, and develop new reporting and integration capabilities.

ASN(M&RA) IT System Modernization for BCNR:
The CAPS-II, CRSC, and BCNR programs are used by the Navy Clemency and Parole Board (NCPB), the Combat Related Special Compensation Board (CRSC), and the Board of Corrections of Naval Records (BCNR) to process and adjudicate approximately 17,200 cases per year. The current system defects have resulted in additional man-hours and reduced reporting functionality. This has created a longer manual process and hinders adequate statistical data from being retrieved. As a result, congressional inquiries take longer to satisfy and accuracy cannot be guaranteed. RDTEN funding will be used to redevelop systems for the CAPS-II, CRSC, and BCNR in order to meet reporting requirements, enhance system capabilities, and gain compliance with current IT standards.
DON TRACKER

Department of the Navy Tasking, Records and Consolidated Knowledge Enterprise Repository (DON TRACKER - formerly known as Enterprise Records and Task Management (ERTM)) is a single, auditable, compliant Records and Task Management process, implemented uniformly across all DON Divisions and Commands, and administered by DON/AA, to enable efficient and effective execution of Records Management (RM) and Task Management (TM) policy in compliance with statute.

ELECTRONIC PROCUREMENT SYSTEM (ePS)

The increase from FY19 to FY20 supports completion of the Limited Deployment (LD) phase of the ePS program in addition to software hosting, gap closure and Release 1 deployment activities. Efforts associated with completion of LD include software configuration, software installation, and test and evaluation. Efforts associated with gap closure and Release 1 include software configuration, software installation, and data migration.

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The electronic Procurement System (ePS) is the Department of the Navy's (DON) End-to-End (E2E) Contract Writing System (CWS). It will provide the Navy and Marine Corps contracting community with a full contract writing management capability and facilitate integration with federally mandated systems, DON financial systems, and industry. The ePS will utilize Department of Defense (DoD) standards and support auditability. The ePS will address existing CWS challenges including outdated architecture, limited capabilities, scalability concerns, and existing legacy systems.

Full deployment of the ePS ensures compliance of the DON's contracting abilities with the following legislative mandates: the writing and management of all contracts must now occur in congressionally approved computer systems (Section 862 of the National Defense Authorization Act (NDAA) of 2013); the central management and oversight of all DoD business (10 U.S. Code (U.S.C.) Section 2222); and all contracting actions must be fully auditable and traceable (Section 1003 of the NDAA 2010 & Office of the Secretary of Defense (OSD) Financial Improvement and Audit Readiness (FIAR) Guidance).

The ePS will use DoD data exchange capabilities (e.g.; Procurement Data Standard (PDS) and Purchase Request Data Standard (PRDS)) in order to achieve standardized data interoperability with external systems. The Navy Enterprise Service Bus (NESB) serves as the hub to relay procurement data to various finance and other systems of record, such as Navy Enterprise Resource Planning (Navy ERP), Standard Accounting & Reporting System (STARS) and Standard Accounting Budgeting & Reporting System (SABRS).

The result of successful ePS implementation will be a contracting workforce that issues accurate and timely contracts in a standard format that comply with all DoD/ Federal laws, regulations, and policies.

NMCI ENTERPRISE SERVICE TOOLS(NEST)

The decrease of $2.286M from FY19 to FY20 is due to fewer developmental efforts. In FY20 the RDTEN funding will be used to address minor requirements after the NGEN-R award; and any changes in DOD/DON procurement policies and mandates.

The NMCI Enterprise Service Tools (NEST) is the NMCI IT service management system that supports the Navy IT service lifecycle business workflow. NEST includes, the NMCI Enterprise Tool (NET) and the Requirements to Award Process Tool (RAPT), which enables and manages the business workflow. NET is a custom NET application that has been built and maintained by the DON to support ordering of IT services. RAPT manages the requirements approval process and stores supporting documentation for previously un-priced line items. RAPT provides NET with relevant identification information for the new orderable solution, which supports the creation of orderable services. NEST serves as the single point of entry for lifecycle management of IT services on the NMCI network.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Modernization - Secretariat | 0.676 | 0.400 | 0.350 | 0.000 | 0.350 |
| ***Articles:*** | - | - | - | - | - |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** The Secretariat has numerous requirements to modernize its financial management system and portal applications. SARMIS will be updated from older technologies to include new FIAR and web based requirements. These upgrades are necessary to continue functionality of the system and ensures timely, accurate and efficient operation of the Secretariat's mission.<br><br>***FY 2019 Plans:***<br>Complete modernization effort.<br><br>***FY 2020 Base Plans:***<br>Continue modernization effort.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY20 decrease is due to RDTEN funding realignment to OMN in order to support the sustainment efforts which will begin during FY 2020. | | | | | |
| ***Title:*** SECNAV Projects (BCNR, CORD, Other) IT System Moderization | 0.000 | 1.058 | 0.350 | 0.000 | 0.350 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** CORB's eCase IT system replaces out-of-date systems and furthers CORB's digitization effort.<br><br>The CAPS-II, CRSC, and BCNR programs are used by the Navy Clemency and Parole Board (NCPB), the Combat Related Special Compensation Board (CRSC), and the Board of Corrections of Naval Records (BCNR) to process and adjudicate approximately 17,200 cases per year. The current system defects have resulted in additional man-hours and reduced reporting functionality. This has created a longer manual process and hinders adequate statistical data from being retrieved. As a result, congressional inquiries take longer to satisfy and accuracy cannot be guaranteed.<br><br>***FY 2019 Plans:***<br>RDTEN funding will be used to redevelop systems for the CAPS-II, CRSC, and BCNR in order to meet reporting requirements, enhance system capabilities, and gain compliance with current IT standards.<br><br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| RDTEN funding will be used continue to redevelop systems for the CAPS-II, CRSC, and BCNR in order to meet reporting requirements, enhance system capabilities, and gain compliance with current IT standards.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY20 funding decrease is due to RDTEN funding being realigned to OMN in order to support the sustainment efforts which will begin during FY 2020. | | | | | |
| ***Title:*** Department of the Navy Tasking, Records and Consolidated Knowledge Enterprise Repository (DON TRACKER)<br>***Articles:***<br>***Description:*** The DON TRACKER will streamline DON's electronic records and task management processes under a consolidated enterprise solution and will enable the DON to capture unstructured and structured electronic records, seamlessly manage tasking across and within all commands, ensure uniform metadata of content, provide workflow-enabled reporting, and aid in compliance with all applicable laws, policies, and regulations. In addition, this will eliminate duplicative capabilities and result in cost-saving opportunities and efficiencies. The DON TRACKER solution will be extended to all authorized, shore and afloat-based users across the DON enterprise, including the Continental United States (CONUS) and Outside the Continental United States (OCONUS) communities.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 0.448<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Electronic Procurement System (ePS)<br>***Articles:***<br>***Description:*** Funding required for the Electronic Procurement System (ePS) to provide support for source selection, | 7.879<br>- | 18.753<br>- | 50.554<br>- | 0.000<br>- | 50.554<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| configuration, integration, testing, training, deployment and implementation of the system.<br><br>***FY 2019 Plans:***<br>- Award the contract to the vendor selected by the Source Selection Authority to begin Limited Deployment. Limited deployment will span across one full command and three small sites and will include 310 critical users (contracting and grants professionals) and 620 non-critical users (small business, financial, legal, etc.). (Non-critical users do not have full access to the system.) Limited deployment will encompass:<br>o Data migration from four systems to one across five databases and five servers<br>o Interface development and testing for four systems (PR Builder, Standard Accounting Budgeting System (SABRS), Navy ERP, and Integrated Management Processing System (IMPS))<br>o Systems configuration and gap closure to ensure all DON contracting requirements for ePS system are met and a commercially viable solution is provided<br>o Systems engineering<br>o Enterprise architecture support<br>o Quality assurance<br>o Development of training material<br>o Over-the-shoulder support as part of implementation<br>- Continue data cleansing and logistics analysis in preparation for data migration from legacy systems into the new ePS solution to reduce the risk of data migration errors.<br>- Software/cloud hosting (Dev/Test environments)<br>- Continue Project Management efforts including implementation preparation, scheduling, configuration management, data management, test and evaluation and updating required documentation for Authority to Proceed (ATP) decision.<br>-Complete LD user migration of contract data from legacy SPS databases to ePS<br>-Complete the Build Technical Review (BTR) for Limited Deployment<br>-Complete Interim Authority to Test (IATT) of the CWS application within a level 5 cloud hosting environment.<br><br>***FY 2020 Base Plans:***<br>Complete Limited Deployment to 310 critical users and 620 non-critical users which will encompass:<br>o Complete Mocks and Cutover for Navy-ERP, PR Builder, SABRS and IMPS<br>o Complete cybersecurity testing to achieve authority to operate (ATO)<br>o Complete integration testing, user acceptance test, operational assessment, operational test readiness review and Initial Operational Test and Evaluation (IOT&E) | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| o Complete production readiness review for limited deployment<br>o Complete user training and begin over-the-shoulder support for limited deployment users<br>o Complete functional configuration audit (FCA)<br><br>Release 1 deployment and gap closure to 3644 critical users and 7658 non-critical users which will entail:<br><br>o Complete data cleansing and begin data migration from NAVSEA, NAVAIR, SPAWAR, ONR, SSP, MSC and USMC Legacy SPS and Seaport databases<br>o Initial gap closure focusing on HCA specific requirements needed for IT services, Grants, Shipbuilding, and SEAPORT.<br>o Interface development and testing for seven systems (MSC-FMS, SYMIS MAT F, MAT MF COST, DIFMS, NEST, STARS-HCM, STARS-FL)<br>o Complete Build Technical Review and Fielding Technical review in support of Release 1<br>o Begin integrated testing in support of release 1<br>o Begin Mock testing MSC-FMS, SYMIS MAT F, MAT MF COST, DIFMS, NEST, STARS-HCM, STARS-FL<br>o Develop updated training based on initial user training<br>o Begin user training for release 1<br>- Data Migration Preparation for Release 2<br>o Complete data profiling in preparation for data cleansing for NAVSUP and NAVFAC<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 to FY20 funding increase of $31.8M is driven by a significant increase in the ePS user community via Limited Deployment (LD), Release 1 (R1), and Release 2 (R2) activities. LD began in FY19 and only incorporated 1 full command and 3 small sites for a total of 310 critical users, with 3 financial interfaces. Release 1 will incorporate 7 full commands including 42 sites) for a total of 3,644 critical users. R1 also begins to incorporate Navy specific requirements into the gap closure, software configuration, and testing activities, and includes the development and testing of 6 additional financial interfaces. FY20 includes LD, the majority of R1 activities, and initial data migration planning activities for R2, which is a significantly larger effort. | | | | | |
| ***Title:*** NMCI Enterprise Service Tools (NEST) | 5.014 | 4.280 | 1.994 | 0.000 | 1.994 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** The NMCI Enterprise Service Tools (NEST) is the NMCI IT service management system that supports the Navy IT service lifecycle business workflow. NEST includes, the NMCI Enterprise Tool (NET) and the Requirements to Award Process Tool (RAPT), which enables and manages the business workflow. NET is a custom NET application that has been built and maintained by the DON to support ordering of IT services. RAPT manages the requirements approval process and stores supporting documentation for previously un-priced line items. RAPT provides NET with relevant identification information for the new orderable solution, which supports the creation of orderable services. NEST serves as the single point of entry for lifecycle management of IT services on the NMCI network. | | | | | |
| ***FY 2019 Plans:***<br>- BFM 2.0 - Appian Conversion: Develop current BFM tool in COTS and develop enhancements to enable future enterprise level planning for PMW 205<br>- NEST Cloud Re-hosting: Continue and complete migration of NEST from current AHF hosting facility to AWS Cloud in support of NGEN-R Requirements<br>- Initial Deployment of MuleSoft: Standardize NEST communication with vendors and external systems; enable enterprise use across program office applications<br>-NET: Task Order Interface(s): Establish interface for transmission of NGEN-R task order data to government financial systems<br>- NET: DODAAC/UIC Reconciliation: Redefine the UIC creation process to meet government requirements under NGEN-R<br>- RAPT R4.0: Appian Conversion: Complete RAPT release to accommodate rapid workflow changes & enhance security through permission based access with a dynamic COTS solution<br>- Complete NET Receiving Reports/NGEN Extension Impacts release: Enable users to review and dispute service billing data prior to the vendor submitting that data as an invoice and Prepare, plan, and integrate solutions to be compatible under new multi-vendor, multi-contract awards<br>- Enterprise Reporting (ER) 2.0: Addition of new enterprise-level dashboards based on program office priorities<br>- RAPT: NGEN-R CLIN Structure: Require a RAPT release once SMIT is finalized to update RAPT request categories and CLIN structure in accordance with finalized PWS language<br>- Implementation of XML firewall security to support account creation in accordance with NETWARCOM guidance | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| In FY20, tasks will be centered on Service Management, Integration and Transport (SMIT) integration, NEST Graphical User Interface (GUI) updates, address any additional requirements after the NGEN-R award, and any changes in DOD/DON procurement policies and mandates. Support will also include identifying and implementation of required interfaces for NGEN-R Federal Procurement Data System - Next Generation(FPDS-NG), ESLs, SMIT Vendor Tools, ERP, etc.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease of $2.286M from FY19 to FY20 is due to fewer developmental efforts. All NGEN-R readiness developmental requirements will be met and the focus will be providing continuity of IT service lifecycle management processes during the transition from the NGEN contract to NGEN-R contract(s). In FY20 the RDTEN funding will be used to address required changes resulting from the NGEN-R award and any changes in DOD/DON procurement policies and mandates. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 14.017 | 24.491 | 53.248 | 0.000 | 53.248 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 8106: *Command Support Equipment* | 3.658 | 2.701 | 6.323 | - | 6.323 | 6.733 | 1.617 | 2.283 | 2.082 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The NMCI Acquisition strategy aims to shift the DON to a multi-vendor, multi-contract environment that aims to provide government-owned IT service lifecycle management. The NEST tools are currently being updated to incorporate enhancements that will enable to new environment.
MODERNIZATION - Contract will be awarded under a competitive, all source, RFP. NO ACAT

The selected contractor must have knowledge of the existing information systems pertinent to the task. They must also have the corporate experience and a staff of knowledgeable personnel to provide the required services. The task will be monitored by the Contracting Officer Representative (COR), who reviews technical data submissions, system deliverables, and invoices to ensure acceptable contractor performance and scheduled deliveries.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

CORB IT System Modernization:

Contract will be awarded under a competitive, all source, RFP. NO ACAT

DON TRACKER
As a general rule, IT development programs use an agile software development methodology therefore milestones, tasks and phases are often conducted in parallel vice sequentially.

This planned acquisition will be a Cost-Plus-Fixed-Fee (CPFF) single award Indefinite Delivery Indefinite Quantity (IDIQ) contract to a selected Vendor in support of sustainment, software development, legacy data transfer, and additional fielding of the DON TRACKER application.

ELECTRONIC PROCUREMENT SYSTEM (ePS)
The ePS program intends to award a 10-year hybrid contract to a single System Integrator (SI). The SI (Prime) will provide required software licenses and required activities for program management, maintenance, systems engineering, design and interface development, testing, deployment, training, and support documentation. This includes all efforts through Full Deployment (FD) and continued sustainment support during the 10-year period of performance.

The ePS will leverage Commercial Off-the-Shelf (COTS) products and capabilities, and is anticipated to consist of three components to achieve full end-to-end capability: 1) a COTS Contract Writing System (CWS) solution; 2) a COTS middleware interfacing capability, known as an Enterprise Service Bus (ESB); and 3) Gap-closure methodologies (e.g.; Business Process Management (BPM) tools, Business Process Re-Engineering (BPR), COTS updates, or a secondary COTS solution).

**E. Performance Metrics**

Program cost, schedule and performance are measured using a systematic approach with approved programs and methods. The results of these measurements are presented to DON/AA management through a governance review board process on a regular basis to determine program effectiveness and to provide new direction as needed to ensure the efficient use of
resources. To monitor and manage the execution of projects in addition to other IT investments, management and governance boards review metrics and key performance indicators that are outlined in various plans. Some of the plans that expound on the data captured to attribute to performance measures include: Project Management Plan, Risk Mitigation Plan, Communication Plan, Procurement Plan, and a Certification & Accreditation Plan.
Other specific performance measurements include:
1. Actual versus planned project scope
2. Actual versus planned time schedule
3. Actual versus planned costs
4. Actual versus planned risks and the mitigation of those risks

BCNR IT System Modernization specific performance measurements include Navy Clemency and Parole Board (NCPB) and the Combat Related Special Compensation Board (CRSC) which process 17,200 cases per year.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

ELECTRONIC PROCUREMENT SYSTEM (ePS):
Reliability:
(Threshold) Mean Time Between Failure (MTBF) >= 720 Hours (Hrs)
(Objective) Mean Time Between Failure (MTBF) >= 1080 Hrs

Operational Availability:
(Threshold) = 96% Including Scheduled Downtime
(Objective) = 99.5% Discounting Scheduled Downtime

Maintainability:
(Threshold) Mean Time to Repair (MTTR) <= 6.7 Hrs
(Objective) Mean Time to Repair (MTTR) <= 2.7 Hrs

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>2901 / *AAUSN IT* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development (Modernization) | C/FP | CACI : Chantilly, VA | 4.555 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Contractor Engineering Support (DONCJIS) | SS/T&M | Interimage Inc. : Manassas, VA | 1.272 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.272 | - |
| Software Development | C/FP | Dell Marketing LP : Round Rock, TX | 1.938 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.938 | - |
| Software Development (CLEOC) | C/FP | NSA : Various | 0.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| SYSTEM Moderization | WR | SPAWAYSYSCEN ATLANTIC : CHARLESTON, SC | 2.950 | 0.676 | Oct 2017 | 0.400 | Oct 2018 | 0.350 | Oct 2019 | - | | 0.350 | 0.000 | 4.376 | - |
| CORB SYSTEM Modernization | WR | SPAWASYSTEM : CHARLESTON, SC | 1.000 | 0.000 | | 1.058 | Oct 2018 | 0.350 | Oct 2019 | - | | 0.350 | 0.000 | 2.408 | - |
| DON TRACKER Engineering | C/CPFF | Progeny : Manassas, VA | 5.749 | 0.448 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| ePS Data Transition Strategy | Various | NAVSUP BSC : Mechanicsburg, PA | 1.602 | 0.100 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.702 | - |
| ePS NESB Data Mapping | C/FP | BOOZ ALLEN : Tysons Corner, Va | 6.700 | 0.450 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.150 | - |
| NESB Configuration and Validation | C/FP | SPAWAR : San Diego, CA | 7.371 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.371 | - |
| Contract Writing System (ePS) | C/FP | TBD : TBD | 0.000 | 0.000 | | 10.138 | Feb 2019 | 41.567 | Feb 2020 | - | | 41.567 | Continuing | Continuing | Continuing |
| NERP Interface Analysis (ePS) | Various | SPAWAR : San Diego, CA | 1.409 | 1.000 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.409 | - |
| | | **Subtotal** | 35.046 | 2.674 | | 11.596 | | 42.267 | | - | | 42.267 | Continuing | Continuing | N/A |

**Remarks**

Increase from FY19 to FY20 supports the continuation of deployments from Limited Deployment (LD) to Release 1 (R1). This includes an increase in the critical user count from 310 users to 3,644 critical users, and an additional 7 interfaces. During FY20, the program will complete Limited Deployment activities such as user training and data migration, and will begin the majority of Release 1 activities including interface development, gap closure activities, integration, testing, data cleansing. Additional Release 2 (R2) data profiling activities will also begin in FY20. Moving from LD to R1 is a significant increase in effort.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Documentation (ePS) | C/IDIQ | MAGA : Washington, DC | 3.734 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.734 | - |
| Cost Analysis (ePS) | C/CPFF | SPAWAR : San Diego, CA | 1.045 | 0.000 | | 0.180 | Jun 2019 | 0.185 | Jun 2020 | - | | 0.185 | 0.000 | 1.410 | - |
| Systems Engineering (ePS) | Various | SPAWAR : San Diego, CA/ Charleston, SC | 13.098 | 1.468 | Sep 2018 | 3.084 | Sep 2019 | 3.114 | Mar 2020 | - | | 3.114 | Continuing | Continuing | Continuing |
| Logistics Analysis (ePS) | Various | SSC LANT : Charleston, SC | 1.431 | 1.205 | Oct 2017 | 1.970 | Oct 2018 | 0.438 | Oct 2019 | - | | 0.438 | Continuing | Continuing | Continuing |
| Requirements Validation (ePS) - Small Business set aside | C/FFP | SPAWAR : San Diego, CA | 1.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.500 | - |
| Project Management/ Implementation (ePS) | Various | Enterprise Horizion : San Francisco, CA | 1.756 | 1.780 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.536 | - |
| ePS Engineering Services - Small Business set aside | Various | Bowhead : Alexandria, VA | 1.170 | 1.482 | Jun 2018 | 0.268 | Jul 2019 | 0.353 | Jul 2020 | - | | 0.353 | 0.000 | 3.273 | - |
| ePS Testing and Validation/ Architecture Tool | Various | NSWC Dahlgren : Dahlgren, VA | 0.050 | 0.050 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.100 | - |
| System Engineering Support (NEST) | C/CPFF | Deloitte : Rosslyn, VA | 0.000 | 5.014 | Nov 2017 | 4.280 | Nov 2018 | 1.994 | Nov 2019 | - | | 1.994 | Continuing | Continuing | Continuing |
| (ePS) Project Management/ Implementation | C/CPFF | Chenega : Chesapeake, VA | 0.000 | 0.294 | Sep 2018 | 0.310 | Sep 2019 | 0.214 | Sep 2020 | - | | 0.214 | 0.000 | 0.818 | - |
| Cloud Broker Services | TBD | NAVAIR : Patuxent River, MD | 0.000 | 0.000 | | 1.100 | Mar 2019 | 2.900 | Mar 2020 | - | | 2.900 | 0.000 | 4.000 | - |
| | | **Subtotal** | 23.784 | 11.293 | | 11.192 | | 9.198 | | - | | 9.198 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Testing Preparations (ePS) | C/FFP | SSC LANT : Charleston, SC | 0.800 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.800 | - |
| Software Hosting (ePS) | C/FP | SPAWAR : San Diego, CA | 0.815 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.815 | - |
| Testing (ePS) | C/FP | OPTEVFOR : NORFOLK,VA | 0.280 | 0.050 | Jun 2018 | 0.635 | Jun 2019 | 0.664 | Jun 2020 | - | | 0.664 | Continuing | Continuing | Continuing |
| Testing (ePS) | TBD | JITC : Ft. Huachuca, AZ | 0.000 | 0.000 | | 0.416 | Feb 2019 | 0.424 | Feb 2020 | - | | 0.424 | 0.000 | 0.840 | - |
| Testing/Cyber | C/CPFF | Falconwood : Arlington, VA | 0.000 | 0.000 | | 0.652 | May 2019 | 0.695 | May 2020 | - | | 0.695 | 0.000 | 1.347 | - |
| | | **Subtotal** | 1.895 | 0.050 | | 1.703 | | 1.783 | | - | | 1.783 | Continuing | Continuing | N/A |

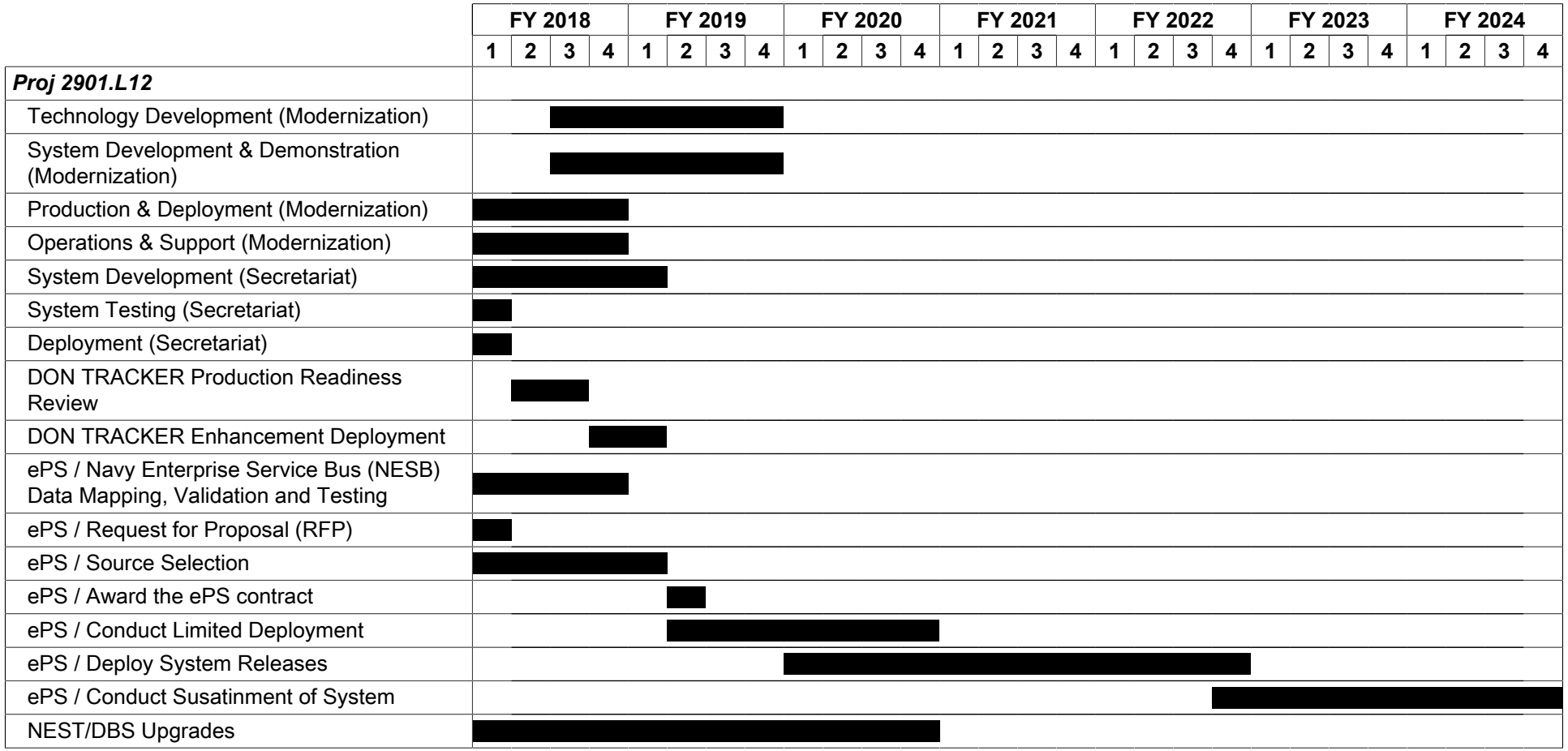
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ePS Program Support | C/FFP | PEO EIS : Arlington, VA | 0.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | - |
| | | **Subtotal** | 0.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.500 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 61.225 | 14.017 | | 24.491 | | 53.248 | | - | | 53.248 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2901 / *AAUSN IT* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2901.L12*** | | | | |
| Technology Development (Modernization) | 3 | 2018 | 4 | 2019 |
| System Development & Demonstration (Modernization) | 3 | 2018 | 4 | 2019 |
| Production & Deployment (Modernization) | 1 | 2018 | 4 | 2018 |
| Operations & Support (Modernization) | 1 | 2018 | 4 | 2018 |
| System Development (Secretariat) | 1 | 2018 | 1 | 2019 |
| System Testing (Secretariat) | 1 | 2018 | 1 | 2018 |
| Deployment (Secretariat) | 1 | 2018 | 1 | 2018 |
| DON TRACKER Production Readiness Review | 2 | 2018 | 3 | 2018 |
| DON TRACKER Enhancement Deployment | 4 | 2018 | 1 | 2019 |
| ePS / Navy Enterprise Service Bus (NESB) Data Mapping, Validation and Testing | 1 | 2018 | 4 | 2018 |
| ePS / Request for Proposal (RFP) | 1 | 2018 | 1 | 2018 |
| ePS / Source Selection | 1 | 2018 | 1 | 2019 |
| ePS / Award the ePS contract | 2 | 2019 | 2 | 2019 |
| ePS / Conduct Limited Deployment | 2 | 2019 | 4 | 2020 |
| ePS / Deploy System Releases | 1 | 2020 | 4 | 2022 |
| ePS / Conduct Susatinment of System | 4 | 2022 | 4 | 2024 |
| NEST/DBS Upgrades | 1 | 2018 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>2903 / *NAVAIR IT* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2903: *NAVAIR IT* | 14.846 | 10.643 | 19.144 | 19.311 | - | 19.311 | 8.094 | 5.839 | 2.267 | 2.312 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Configuration Management System (CMS) - This program was originally identified as Joint Configuration Management Information System (JCMIS) to reflect the main software tool used for component tracking and Aircraft Configuration Management. However, as the available data sources from the fleet have expanded, the new name of CMS was chosen to better acknowledge the variety of information sources which are received, integrated, and compiled to give the most accurate component record data and aircraft configuration. CMS serves as the Program of Record (POR) to manage and control Navy and Marine Corps aviation component data reconstruction efforts. CMS compiles record data via fleet documentation of component updates and captures this information via a centrally managed database within the current software tool, Joint Configuration Management Information System (JCMIS). CMS efficiently manages product structure data, including complex interrelationships between assemblies and subassemblies, technical documentation and the parts that comprise the item. Accurate, complete and accessible configuration data is critical to the successful operations of DoD weapon systems or tracked assets. Mission readiness and operational capabilities are enhanced by CMS, as consistent integrated configuration data is readily available to operators, maintainers and logistics personnel. CMS provides users with a common database infrastructure to ensure compatibility, quality, and consistency of Configuration Management (CM) processes and provides configuration managers and analysts the validated CM information necessary for accurate maintenance, spare procurements, reliability and safety analysis, and mission readiness. Funding is budgeted to support the services of re-hosting and testing of Commercial off-the-shelf (COTS) upgrades to ensure objective performance of CMS is achieved.

Navy Cybersecurity - Cyber Warfare consists of many different aspects to include sabotage of our weapon systems, networks as well as enablement of missions. Nation and non-nation state actors are acquiring and employing more advanced cyber-attacks in order to exploit our networks and aviation systems challenging our technological edge. The threats and capabilities are real and range from exploiting capabilities, overloading weapons systems and logistics supply chains, to jamming signals or taking control of weapons systems. We must defend against adversarial cyber attacks while contributing to the exploitation of cyber warfare capabilities.

To meet these challenges and address the Chief of Naval Operations priorities and tasking, these R&D efforts are specifically focused on Naval Air Systems Command weapon or control systems and programs to ensure warfighting effectiveness as part of integrated / multi-platform kill chains. These research and development efforts will strengthen our cyber posture by developing research, development, test and evaluation capabilities and solutions to deter, detect, and mitigate cyber threats and safeguard classified naval aviation systems and platforms from "cradle to grave." These solutions will be integrated into the acquisition of weapons systems to enhance security, increase lethality, and improve resiliency in the expected operational environments. Our weapon or control systems are unique in the aforementioned environments and mission, but also in the presence of numerous non-traditional access points and trusted cyber relationships required for operational environments.

Digital Thread (DT)- Capability provides digital process integration with complete, secure and authoritative data. DT integrates the product life cycle, and includes all the processes that are needed to design, develop, test, produce, and support a product. Connecting these processes using standardized digital tools and data accelerates the product development cycle and lowers costs for support and new capability integration. The Digital Thread capability includes development and demonstration of cyber security architectures for sustainment information systems, and development of a digital manufacturing data architecture and repository.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** CMIS Annual Software Release | 0.624 | 0.674 | 0.639 | 0.000 | 0.639 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>CMS will maintain the existing JCMIS software sustainment posture while leveraging best practices to maximize component data accuracy and integrity through interfaces with other available fleet data sources. Analyze and optimize system functionality, input and presentation capabilities in order to improve data reconstruction efforts for fleet requestors. Investigate use of existing capability improvements provided by technological advancements such as digital capture and upload of aircraft configuration data, exchange of data with other fleet systems of record, incorporation of new component data sets, improving fleet serial number tracking processes and other approaches to improve fleet readiness and safety postures. Continue to proactively respond to evolving threats, new vulnerabilities, and changing DON Cyber Security policy to ensure adequate continued system software and architecture security posture. Comply with applicable information assurance updates including information assurance vulnerability alerts, information assurance vulnerability bulletins, information assurance vulnerability technical, Microsoft, and all supporting software updates. Continue generation of solutions and mitigation plans for vulnerabilities identified during system assured compliance assessment solution scans. Continue monitoring for changes and compliance with applicable security technical implementation guided checklists and security content automation protocol results as required by security policies. Continue to monitor and ensure Section 508 compliance within system. Continue timely and efficient system and/or software solutions in response to customer/fleet requests that involve modification/update to system software/architecture. Continue necessary development efforts in response to COTS obsolescence scenarios and evolve an open standard interface to other systems as required. Mapping of JCMIS data with AutoLogSet (ALS) records is to be completed in order to map the fields found within JCMIS to their ALS equivalents. This will allow the collation of information between the data sources. | | | | | |
| ***FY 2020 Base Plans:***<br>CMS will maintain the existing JCMIS system refresh posture while leveraging best practices to maximize component data accuracy and integrity. Analyze and optimize system functionality, input and presentation capabilities in order to improve data reconstruction efforts for fleet requestors. Investigate capability improvements provided by technological advancements such as digital upload of information, exchange of data with other fleet systems of record, incorporation of other component data sets, improving fleet serial number tracking processes and other approaches to improve fleet readiness and safety postures. Continue to respond to evolving threats, new vulnerabilities, and changing DON Cyber Security policy to ensure adequate continued system software and architecture security. Continue generation of solutions and mitigation plans for | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| vulnerabilities identified during system assured compliance assessment solution scans. Continue monitoring for changes and compliance with new security technical implementation guided checklists and security content automation protocol results as required by security policies. Continue to monitor and ensure Section 508 compliance within system as new features are enabled or new compliance guidance is released. Continue timely and efficient system and/or software solutions in response to customer/fleet requests that involve modification/ updates to system software/architecture. Continue necessary development efforts in response to COTS obsolescence scenarios and evolve an open standard interface to other systems as required. Component data entry with ALS integration is to be developed to allow the direct entry of component related data into the system at the fleet level and the ability to present and query the integrate JCMIS/ALS data within the system.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $0.035M decrease from FY 2019 to FY 2020 is due to decreased Program Management Oversight for the continuous development efforts in response to COTS obsolescence scenarios. | | | | | |
| ***Title:*** Navy Cybersecurity | 10.019 | 5.372 | 4.639 | 0.000 | 4.639 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>- Broad Agency Announcement (BAA) new awards / continuation of development, demonstration and transition of cyber security solutions across 8 identified technology areas.<br>- Augmentation and maturation of lab capabilities across multiple NAVAIR sites to conduct Cyber security RDT&E for NAVAIR programs.<br>- Continued development and maturation of new customized tools, methodologies, and procedures for RDT&E of control<br>system interfaces and penetration testing that tie to identified risk assessment capability gaps and emergent threats.<br>- Continued support of emergent FLTCYBERCOM TASKORDs requiring urgent development of customized control systems solutions for identified Fleet risks.<br>- Increased FY19 Capability investment directly supports emergent intelligence, FCC TASKORDs, Blackbeard AAR, NDAA 1647, Aviation Resiliency and OSD DSB study. Without this capability investment the US Navy will continue to be vulnerable to attacks on its non-traditional systems (e.g., aircraft, weapons, radars, ALRE) and | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| will result in significant residual risk to aviation combat systems. Broad Agency Announcements are in place to execute FY18 funding increases.<br><br>***FY 2020 Base Plans:***<br>Broad Agency Announcement (BAA) new awards and continuation for the development, demonstration, and transition of cyber security solutions across identified critical technology areas.<br>- Continue augmentation and maturation of laboratory capabilities, environments and customized toolsets across multiple NAVAIR sites and facilities to conduct cyber security Research, Development, Test and Evaluation (RDT&E) for NAVAIR programs.<br>- Continued development aviation weapon systems customized tools, methodologies, and procedures identified from Cyber Risk Assessments, Cyber Table Tops, test and evaluation capability gaps and emergent threats. Increased program and Fleet support capability for penetration testing and engineering investigations.<br>- Continued support of emergent Fleet Cyber Command/10th Fleet (FLTCYBERCOM/C10F) Tasking Orders (TASKORD) requiring urgent development of customized weapon and control systems solutions for identified Fleet risks.<br>- Increased FY20 capability investment directly supports emergent intelligence, FLTCYBERCOM/C10F TASKORDs, Blackbeard After Action Report (AAR), National Defense Authorization Act (NDAA) 1647 Weapons Systems Evaluations, Aviation Resiliency, incident response investigations, and OSD Defense Science Board Task Force for Cyber Deterrence recommendations. Without this capability investment the US Navy will continue to be vulnerable to attacks on its non-traditional systems (e.g., Aircraft, Weapons, Radars, Aircraft Launch and Recovery Equipment (ALRE)) and will result in significant residual risk to aviation combat systems. Broad Agency Announcements are in place to execute FY20 funding increases.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $0.733M decrease in NAWC Support in development aviation weapon systems customized tools, methodologies, and procedures.<br>The FY 2020 funding request was reduced by $.525 million to account for the availability of prior year execution balances | | | | | |
| ***Title:*** Digital Thread | 0.000 | 13.098 | 14.033 | 0.000 | 14.033 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Establish a production capability to provide maintainers access to the correct digital Configuration Managed Information for faster and more accurate on site execution and to allow for an increase in Readiness managed within the Fleet Community. Utilize a combination of digital demonstration efforts that have been ongoing at Commander Fleet Readiness Centers and Naval Air Warfare Center Aircraft Division to extend those capabilities into a cohesive solution that has implications for I-Level maintainers and serves as a baseline for O-Level engagement. Develop cyber security/data architectures and repository for digital manufacturing data.<br>***FY 2020 Base Plans:***<br>Extend DT-IDRN capabilities to overall processes including digital engineering data, integrated quality management, digital manufacturing connectivity. Develop and implement digital workflows to accelerate processes and manage digital technical data. Develop and implement digital interfaces to Aviation Logistics Environment (ALE) logistics Information Technology (IT) systems including Joint Engineering Data Management Information & Control System (JEDMICS) and Joint Deficiency Reporting System (JDRS). Integrate Program Management Activity (PMA) Product Life Cycle (PLM) systems with IDRN to manage digital technical data for key platforms.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $0.935M increase is due to the development and implementation of the digital interfaces to Aviation Logistics Environment (ALE) logistics Information Technology (IT) systems including Joint Engineering Data Management Information & Control System (JEDMICS) and Joint Deficiency Reporting System (JDRS). | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.643 | 19.144 | 19.311 | 0.000 | 19.311 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The Configuration Management System (CMS) Program used Joint Logistics Systems Center (JLSC) funds to evolve JCMIS to Software Release 5.0. In June 1998 JCMIS was transferred to the Navy as executive agent and NAVAIR as program manager. Program Budget Decision 401 transferred joint funding from JLSC to NAVAIR. The CMS Program Manager continues to evolve the program to keep pace with cost, changing business processes, data integration, and evolving commercial and military standards. Various contractors using competitively awarded contracts have supported the program.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

Navy Cybersecurity - The Navy Cybersecurity strategy is in 3 concurrent steps:
1. Broad Agency Announcements (BAA) for resilient cyber warfare capabilities and control system solutions for NAVAIR Weapon Systems. Draft BAA delineating Naval Research Areas of Interest; Specific Areas of Interest; Technologies Being Sought; Proposal Submission; Proposal Abstracts; Full Proposal; General Information, and Evaluation Criteria.
The objective of the BAA is principally to orchestrate germane research and development to fill the gaps in cyber warfare capabilities for Naval Air Systems Command (NAVAIR) weapon systems, i.e., secure weapon systems able to survive and exploit cyber warfare. Areas of interest include but not limited to:
1) SWaP sensitive cyber resiliency for RTOS and aviation warfare environment
2) Access point identification, prioritization and defense
3) Cyber-Electronic Warfare convergent capabilities
4) Full acquisition cycle cyber security measures
5) Cyber test, inspection, incident response and training tools
6) Cyber warning systems
7) Cyber fault, risk and threat assessment methodologies

2. Advanced Cyber Lab (ACL)
Achieve capability to respond to cyber incidents, conduct federated avionics penetration tests in support of cyber risk assessments and develop control system solutions for NAVAIR weapon systems and acquisition programs. Assessing BAA solutions for Naval Aviation. Acquire delineated specialized equipment, software tools, space, power, cooling, and security.
1) Secure Messaging - Cryptography, Steganography, etc.
2) Embedded Operating System Threat Assessment, Software Reverse Engineering, Federated Penetration Testing of Custom Control Systems
3) Advanced Anti-tamper, Digital Forensics
4) Microelectronics Reverse Engineering
5) Capabilities in response to Denial of Service, Precision Direct Attack/ Root Kits, Interdiction / Data in transit and Infrastructure / SCADA attacks.
6) Portable Assessment and Test

3. Organic Cyber Solutions for NAVAIR Customized Control Systems
Project investigation and development or tools and tailored solutions for our control systems and improve the cyber security at control system entry points will be completed. Areas discovered include but are not limited to:
1) Intrusion Detection / Prevention Systems (IDS/IPS) for Real Time systems
2) Live-CD boot
3) Out of Band Monitoring & Authentication
4) Weapon System of Systems Architecture tools
5) Avionics Fuzzing
6) Federated Penetration Testing Tool Set & Non-Destructive Inspection Tool

7) Dynamic Network Maneuvering
8) Weapon System Side Channel Analysis

Digital Thread - Digital Thread/Cyber Security Architecture and Strategy
1) Develop cyber security architecture standards for Naval Aviation Environment (NAE) Digital Thread.
2) Develop IT and data architecture for NAE Digital Thread to accelerate maintenance and sustainment and support digital manufacturing capabilities including design, manufacturing, and materials data.
3) Implement cyber security architecture for NAE Digital Thread including COMFRC, Logistics IT, PMAs.
4) Implement Phase 1 of NAE Digital Thread Integrated Digital Resource Network (DT-IDRN) at D-level locations.
5) Stand up developmental digital manufacturing data repository that includes digital design and digital material database.
6) Integrate digital manufacturing data repository into DT-IDRN.

**E. Performance Metrics**

Configuration Management System (CMS) - Milestone C Spiral Development:
1. During the life of the contract verify conformance with agency specific information processing standards and functional requirements.
2. Prior to delivery of enhanced software, demonstrate the operational capability of the system software.
3. Functionality of the software must meet required systems architecture and processing capabilities.
4. All requirements mandated by law or regulation must be 100% compliant.
5. Independent Verification and Validation will be used for testing new releases of software to determine that previous functionality is maintained.
6. Customer satisfaction will be measured through limited validated customer complaints, feedback, and surveys.

Navy Cybersecurity:
1. Establish Broad Agency Announcements (BAA) for Resilient Cyber Warfare Capabilities for Naval Air Systems Command Weapon Systems: Receive responses that address at key areas of interest.
2. Advanced Cyber Lab: Operating capability workstations and inter agency task team.
3. Organic Cyber Solutions for NAVAIR Control Systems: Complete all projects.

Digital Thread:
During execution of the funding the following will be used to validate the performance:
1. Contract performance to plan and on time delivery of all contract deliverables
2. Completion of cyber security, IT, and data architectures for NAE Digital Thread
3. Completion of developmental digital manufacturing data repository
4. Standup of Phase 1 DT IDRN at D-Level locations
5. Integration of digital manufacturing data repository into DT-IDRN

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solutions for Cyber Warfare Capabilities for Navy Cybersecurity | Various | Various : Various | 8.019 | 3.178 | Oct 2017 | 2.147 | Oct 2018 | 2.050 | Oct 2019 | - | | 2.050 | Continuing | Continuing | Continuing |
| Solutions for Digital Thread | Various | Various : Various | 0.614 | 0.000 | | 9.500 | Oct 2018 | 11.500 | Oct 2019 | - | | 11.500 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.633 | 3.178 | | 11.647 | | 13.550 | | - | | 13.550 | Continuing | Continuing | N/A |

**Remarks**

Digital Thread increase in FY20 due to the development and implementation of digital workflows to accelerate processes and manage digital technical data. Develop and implement digital interfaces to Aviation Logistics Environment (ALE) logistics Information Technology (IT) systems including Joint Engineering Data Management Information & Control System (JEDMICS) and Joint Deficiency Reporting System (JDRS).

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Support for Configuration Management Information System (JCMIS) | C/FFP | NAVSUP : Mechanicsburg, PA | 1.869 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Support for Configuration Management Information System (JCMIS) | C/FFP | Wyle : Lexington Park, MD | 0.862 | 0.477 | Mar 2018 | 0.506 | Mar 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Support for Configuration Management Information System (JCMIS) | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.501 | Mar 2020 | - | | 0.501 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.731 | 0.477 | | 0.506 | | 0.501 | | - | | 0.501 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

**Management Services ($ in Millions)**

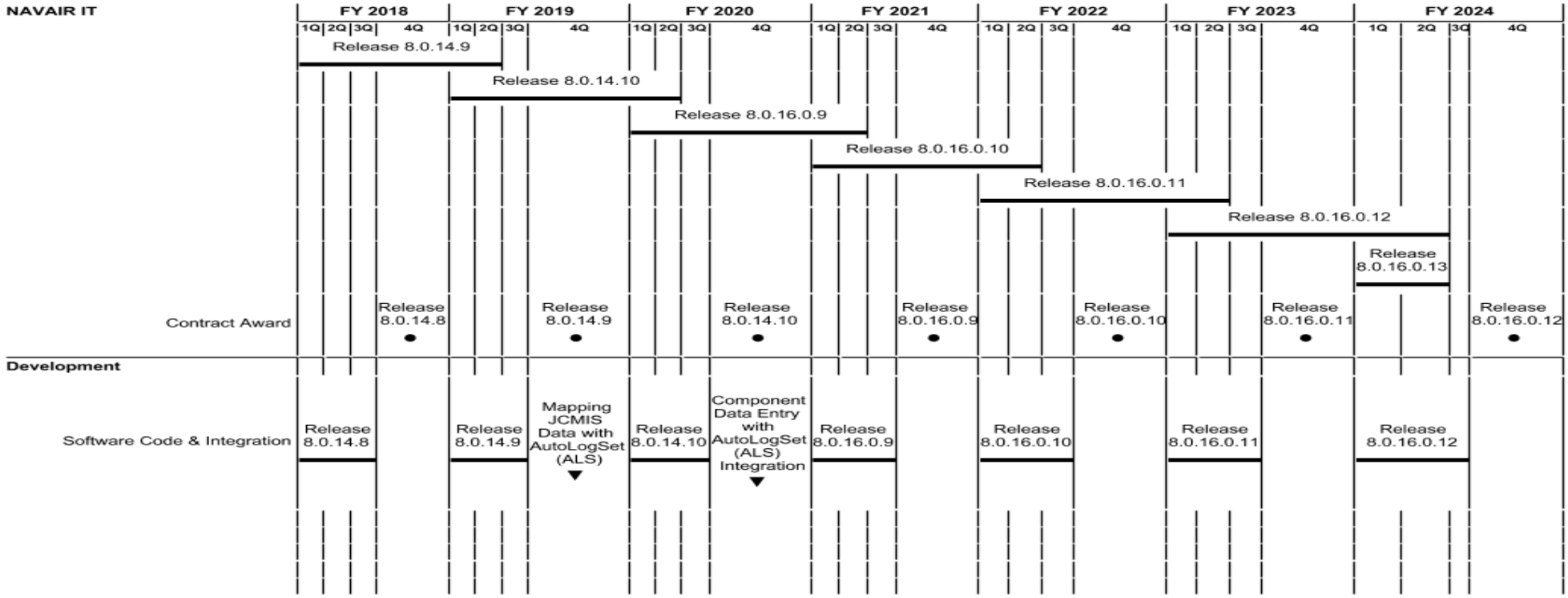
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support for Configuration Management Information System (JCMIS) | WR | NAWCAD : Patuxent River, MD | 0.925 | 0.147 | Dec 2017 | 0.168 | Dec 2018 | 0.138 | Dec 2019 | - | | 0.138 | Continuing | Continuing | Continuing |
| Systems Engineering Support for Navy Cybersecurity | WR | NAWCAD : Patuxent River, MD | 2.270 | 6.324 | Oct 2017 | 1.937 | Oct 2018 | 1.800 | Oct 2019 | - | | 1.800 | Continuing | Continuing | Continuing |
| Systems Engineering Support for Digital Thread | WR | NAWCAD : Patuxent River, MD | 0.287 | 0.000 | | 3.526 | Oct 2018 | 2.533 | Oct 2019 | - | | 2.533 | Continuing | Continuing | Continuing |
| Systems Engineering Support for Navy Cybersecurity | WR | NAWCWD : China Lake, CA | 0.000 | 0.517 | Oct 2017 | 1.360 | Oct 2018 | 0.789 | Oct 2019 | - | | 0.789 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.482 | 6.988 | | 6.991 | | 5.260 | | - | | 5.260 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 14.846 | 10.643 | | 19.144 | | 19.311 | | - | | 19.311 | Continuing | Continuing | N/A |

**Remarks**

Footnotes:
Digital Thread increase in FY20 due to the development and implementation of digital workflows to accelerate processes and manage digital technical data. Develop and implement digital interfaces to Aviation Logistics Environment (ALE) logistics Information Technology (IT) systems including Joint Engineering Data Management Information & Control System (JEDMICS) and Joint Deficiency Reporting System (JDRS).

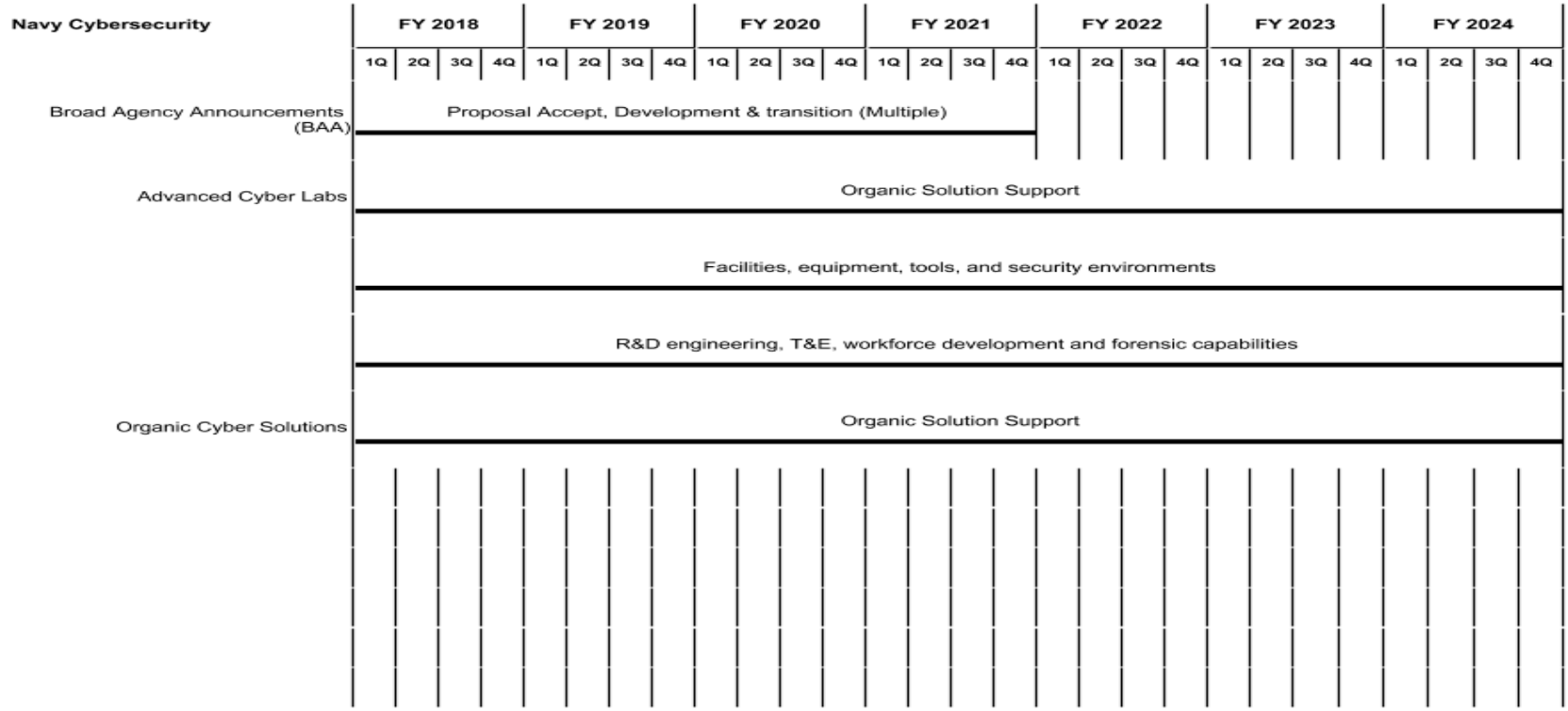
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |




*2020DON - 0605013N - 2903*

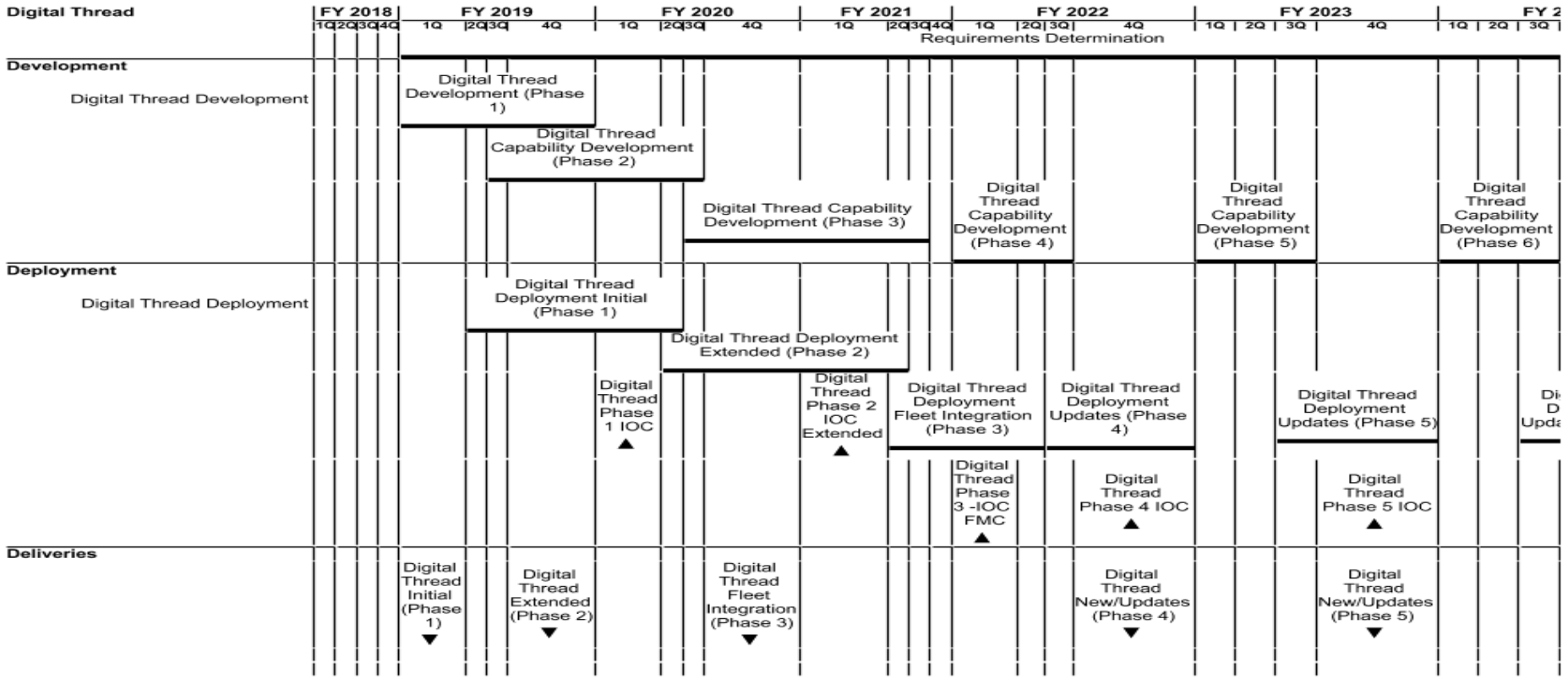
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |




*2020DON - 0605013N - 2903*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |




*2020DON - 0605013N - 2903*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***NAVAIR IT*** | | | | |
| Requirements Determination: Release 8.0.14.9 | 1 | 2018 | 2 | 2019 |
| Requirements Determination: Release 8.0.14.10 | 1 | 2019 | 2 | 2020 |
| Requirements Determination: Release 8.0.16.0.9 | 1 | 2020 | 2 | 2021 |
| Requirements Determination: Release 8.0.16.0.10 | 1 | 2021 | 2 | 2022 |
| Requirements Determination: Release 8.0.16.0.11 | 1 | 2022 | 2 | 2023 |
| Requirements Determination: Release 8.0.16.0.12 | 1 | 2023 | 2 | 2024 |
| Requirements Determination: Release 8.0.16.0.13 | 1 | 2024 | 2 | 2024 |
| Contract Award: Contract Award, Release 8.0.14.8 | 4 | 2018 | 4 | 2018 |
| Contract Award: Contract Award, Release 8.0.14.9 | 4 | 2019 | 4 | 2019 |
| Contract Award: Contract Award, Release 8.0.14.10 | 4 | 2020 | 4 | 2020 |
| Contract Award: Contract Award, Release 8.0.16.0.9 | 4 | 2021 | 4 | 2021 |
| Contract Award: Contract Award, Release 8.0.16.0.10 | 4 | 2022 | 4 | 2022 |
| Contract Award: Contract Award, Release 8.0.16.0.11 | 4 | 2023 | 4 | 2023 |
| Contract Award: Contract Award, Release 8.0.16.0.12 | 4 | 2024 | 4 | 2024 |
| Development: Software Code & Integration: Release 8.0.14.8 | 1 | 2018 | 3 | 2018 |
| Development: Software Code & Integration: Release 8.0.14.9 | 1 | 2019 | 3 | 2019 |
| Development: Software Code & Integration: Release 8.0.14.10 | 1 | 2020 | 3 | 2020 |
| Development: Software Code & Integration: Release 8.0.16.0.9 | 1 | 2021 | 3 | 2021 |
| Development: Software Code & Integration: Release 8.0.16.0.10 | 1 | 2022 | 3 | 2022 |
| Development: Software Code & Integration: Release 8.0.16.0.11 | 1 | 2023 | 3 | 2023 |
| Development: Software Code & Integration: Release 8.0.16.0.12 | 1 | 2024 | 3 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Development: Software Code & Integration: Functionality Improvement: Mapping JCMIS Data with AutoLogSet (ALS) | 4 | 2019 | 4 | 2019 |
| Development: Software Code & Integration: Functionality Improvement: Component Data Entry with AutoLogSet (ALS) Integration | 4 | 2020 | 4 | 2020 |
| ***Navy Cybersecurity*** | | | | |
| Broad Agency Announcements (BAA): Proposal Acceptance, Development & transition (Multiple) | 1 | 2018 | 4 | 2021 |
| Advanced Cyber Labs: Support Organic/BAA/industry solutions | 1 | 2018 | 4 | 2024 |
| Advanced Cyber Labs: Facilities, equipment, tools, and security environments | 1 | 2018 | 4 | 2024 |
| Advanced Cyber Labs: R&D engineering, T&E, workforce development and forensic capabilities | 1 | 2018 | 4 | 2024 |
| Organic Cyber Solutions: control systems solution development and evaluation | 1 | 2018 | 4 | 2024 |
| ***Digital Thread*** | | | | |
| Requirements Determination | 1 | 2019 | 4 | 2024 |
| Development: Digital Thread Development: Digital Thread Capability Development Initial (Phase 1) | 1 | 2019 | 4 | 2019 |
| Development: Digital Thread Development: Digital Thread Capability Development Extended (Phase 2) | 3 | 2019 | 3 | 2020 |
| Development: Digital Thread Development: Digital Thread Capability Development Fleet Integration (Phase 3) | 3 | 2020 | 3 | 2021 |
| Development: Digital Thread Development: Digital Thread Capability Development New/Updates (Phase 4) | 1 | 2022 | 3 | 2022 |
| Development: Digital Thread Development: Digital Thread Capability Development New/Updates (Phase 5) | 1 | 2023 | 3 | 2023 |
| Development: Digital Thread Development: Digital Thread Capability Development New/Updates (Phase 6) | 1 | 2024 | 3 | 2024 |
| Deployment: Digital Thread Deployment: Digital Thread Deployment Initial (Phase 1) | 2 | 2019 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2903 / *NAVAIR IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deployment: Digital Thread Deployment: Digital Thread Deployment Extended (Phase 2) | 2 | 2020 | 2 | 2021 |
| Deployment: Digital Thread Deployment: Digital Thread Deployment Fleet Integration (Phase 3) | 2 | 2021 | 2 | 2022 |
| Deployment: Digital Thread Deployment: Digital Thread Deployment New/Updates (Phase 4) | 3 | 2022 | 4 | 2022 |
| Deployment: Digital Thread Deployment: Digital Thread Deployment New/Updates (Phase 5) | 3 | 2023 | 4 | 2023 |
| Deployment: Digital Thread Deployment: Digital Thread Deployment New/Updates (Phase 6) | 3 | 2024 | 4 | 2024 |
| Deployment: Digital Thread Deployment: Digital Thread Phase 1 IOC | 1 | 2020 | 1 | 2020 |
| Deployment: Digital Thread Deployment: Digital Thread Phase 2 IOC Extended | 1 | 2021 | 1 | 2021 |
| Deployment: Digital Thread Deployment: Digital Thread Phase 3- IOC FMC | 1 | 2022 | 1 | 2022 |
| Deployment: Digital Thread Deployment: Digital Thread Phase 4 IOC | 4 | 2022 | 4 | 2022 |
| Deployment: Digital Thread Deployment: Digital Thread Phase 5 IOC | 4 | 2023 | 4 | 2023 |
| Deployment: Digital Thread Deployment: Digital Thread Phase 6 IOC | 4 | 2024 | 4 | 2024 |
| Deliveries: Digital Thread Initial (Phase 1) | 1 | 2019 | 1 | 2019 |
| Deliveries: Digital Thread Extended (Phase 2) | 4 | 2019 | 4 | 2019 |
| Deliveries: Digital Thread Fleet Integration (Phase 3) | 4 | 2020 | 4 | 2020 |
| Deliveries: Digital Thread New/Updates (Phase 4) | 4 | 2022 | 4 | 2022 |
| Deliveries: Digital Thread New/Updates (Phase 5) | 4 | 2023 | 4 | 2023 |
| Deliveries: Digital Thread New/Updates (Phase 6) | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>2904 / *NAVSEA IT* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2904: *NAVSEA IT* | 181.244 | 49.600 | 35.382 | 15.696 | - | 15.696 | 24.813 | 14.701 | 16.134 | 16.457 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Navy Maritime Maintenance Enterprise Solution (NMMES) is the Information Technology (IT) toolset currently utilized to execute ship and submarine maintenance in the Naval Shipyards (NSY), Regional Maintenance Centers (RMC), Ship Repair Facility (SRF), Intermediate Maintenance Facilities (IMF), and commercial industrial sites worldwide. These maintenance activities support Fleet operations 24 hours per day, 7 days per week. The NMMES IT solution is used by over 40,000 civilians and military who conduct over $6.5B of ships maintenance and modernization on an annual basis. The NMMES program includes sustainment as well as multiple modernization efforts to insure the continued effectiveness of the Fleet maintenance IT toolset. These efforts consist of adding mandatory enhancements, such as Financial Improvement and Audit Readiness (FIAR) changes and aligning with the Standard Accounting Budget Reporting System (SABRS) system. The NMMES program provides for software changes, retiring and/or replacing of costly legacy systems, transition planning, and systems engineering for integration with existing and future solutions. These efforts align with direction to insure that proposed interim solutions support and facilitate the transition to the planned maintenance solution end state. This program will provide modernization, migration, testing, and consolidation of obsolete legacy systems to the next generation of centrally hosted tools supporting Fleet Maintenance systems for the Navy.

The NMMES-TR program and budget was moved to new PU 3432 within PE 0605013N starting in FY 2019 as a result of designation as a Business System Category 1 acquisition program.

Funding for NMMES PU 2904 addresses critical deficiencies and minimizes the inherent risks that a catastrophic systems failure would be to fleet readiness. The increase in funds is required to support the modernizations of products that are on outdated software and to enhance the existing applications to make them cloud capable. It also provides for software enhancements required to make applications Financial Improvement and Audit Readiness (FIAR) compliant and to enable system modifications of financial feeder applications to interface with a FIAR compliant system of record. The requirement to handle 3-D integrated product models being delivered with CVN-78, Virginia Class and Columbia Class are also driving the increase. NAVSEA plans to execute these funds primarily through a current sustainment contract and several separate contracts through existing delivery orders to gain the specialized resources and material necessary to sustain these vital systems until spiral deployment of the NMMES Technical Refresh (TR) solution. The Workforce Management and Financial Management systems were removed from the NMMES TR scope by the Analysis of Alternative (AoA) Preferred Alternative, and will continue operation and sustainment as part of the NMMES portfolio. There is an overlapping period of time where both solutions are operating and requiring sustainment, hence the increase in the requested amounts for current systems and subsequent replacement system(s). The NMMES-TR program and budget was moved to new PU 3432 starting in FY 2019 as a result of designation as a Business System Category 1 acquisition program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Project Sequencing & Scheduling (PSS) Upgrade | 2.500 | 1.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The PSS scheduling system provides the naval shipyards (Portsmouth Naval Shipyard, Puget Sound Naval Shipyard & IMF, Pearl Harbor Naval Shipyard & IMF, and Norfolk Naval Shipyard) with a customized, flexible scheduling tool for CNO availabilities and other maintenance, repair and overhaul work assigned to the activities. Key system objectives include: 1) Standardization of the scheduling processes and tools; 2) Creation of dates for use in the NMMES project management software; 3) Generation of user and management reports covering all aspects of scheduling of a ship or submarine availability. The current PSS application is based on a 1980s proprietary commercial product originally acquired over 25 years ago. The application is outdated and the vendor has informed the Navy that it will no longer be supported in the near future requiring Navy to pursue an immediate upgrade to a supportable product, while not interrupted maintenance availabilities. The product had already become increasingly difficult to maintain and with the pending loss of vendor support could lead to catastrophic system failure and loss of ability to maintain project schedules. The PSS Upgrade will convert the system from the Robbins-Gioia CAT proprietary solution to the Robbins-Gioia Jaguar 2020 (J2020) solution and improve the web-basing of the system.<br><br>***FY 2019 Plans:***<br>Complete GAT of the product and conduct implementation and training of the user community in the use of the PSS Upgrade.<br><br>***FY 2020 Base Plans:***<br>N/A.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding decrease of $1.0M aligns with project deployment and completion. | | | | | |
| ***Title:*** electronic Technical Work Document (eTWD) | 7.316 | 7.842 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The eTWD Initiative is a NAVSEA Sponsored, CNO approved Reduction in Total Ownership Cost (RTOC) Initiative to establish interactive electronic Technical Work Document (eTWD) capability for use in the naval shipyards. An eTWD will be used to execute maintenance, repair, overhaul and modernization work packages on ships and submarines undergoing major availabilities in naval shipyards. This solution will provide | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| paperless work packages, pulling authoritative data from the existing NMMES Family of Systems supporting ship maintenance. The interactive electronic work instruction will be used at the jobsite replacing the current paper driven instructions. The overall goal for eTWD is twofold: 1) to reduce the resources and time preparing, executing and certifying work instructions; and 2) enable the non-stop execution of work by having online documents and accessible for problem resolution. The eTWD Initiative is in progress.<br><br>***FY 2019 Plans:***<br>Complete the pre-deployment planning and training necessary to begin implementation in a Naval shipyard. Following stabilization of eTWD operation of first naval shipyard deployment, continue implementation at the remaining naval shipyards.<br><br>***FY 2020 Base Plans:***<br>Sustainment of deployed eTWD toolset using Operations & Maintenance, Navy (O&M,N) funds.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 increased by $0.801M based on execution year testing and integration requirements. FY20 decrease of $7.031M represents completion of eTWD Increment 1A. Subsequent increments may be initiated depending on contract status and effectiveness of 1A capability. | | | | | |
| ***Title:*** Planned Maintenance System (PMS) Upgrade | 3.128 | 1.495 | 1.195 | 0.000 | 1.195 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The Planned Maintenance System Management Information System (PMSMIS) is a web solution that tracks the status of all Maintenance Index Pages (MIPs) and Maintenance Requirements Cards (MRCs) including new and revised documentation, allows for Technical Feedback Report (TFBR) generation and tracking from initial reporting to problem resolution, management of activity documentation distribution information, document development history including Reliability-Centered Maintenance (RCM) information and other data needed to support all forms of planned maintenance in the Fleet. The existing process requires excessive sailor and shore expert administrative burden, creates complex and ambiguous documents that can be difficult to follow, takes too long to implement changes, leads to equipment maintenance not being properly executed, and lacks tools for leadership to monitor program implementation and assure satisfactory performance. Furthermore, the existing process does not support distributed and optimally-manned ship concepts of operation, such as those now used by the Naval Expeditionary Combat Command and the Littoral | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Combat Ship. The future PMS Upgrade will also provide visibility to shore maintenance leaders to ensure equipment is consistently scheduled throughout the fleet and to identify execution issues.<br><br>***FY 2019 Plans:***<br>The software configuration, integration, standardization, and development efforts for PMSMIS and PMS Scheduling will begin. This will occur in line with the updates required to transition to the Risk Management Framework for cybersecurity.<br><br>***FY 2020 Base Plans:***<br>Complete development and testing on the PMSMIS and PMS Scheduling tools and begin preparation for the integration with the PMS maintenance and material management upgrade. The Ships 3-M development efforts will begin in FY21-22 and the complete end-to-end testing and deployment will complete prior to FY23.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 increased by $0.186M to reflect updated execution year plans. FY20 Project decreased by $0.144M: The FY 2020 funding request was reduced by $6.917 million to account for the availability of prior year execution balances. Funding was moved to FY21 & FY22. Testing completion well be delayed until FY21. | | | | | |
| ***Title:*** Strategic Planning &Forecasting (SPF) Upgrade | 2.232 | 1.755 | 2.745 | 0.000 | 2.745 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** SPF is part of a suite of tools in the NMMES Family of Systems that are utilized to assist Navy industrial activities in resource planning and long term workload forecasting to meet CNO strategic maintenance requirements through the gathering and compiling of workforce data. Two additional systems; 1) Performance Measurement and Control (PMC) and Quality Performance System (QPS) are interfaced with SPF to produce the staffing, planning and performance measurement analysis necessary to successfully accomplish work in navy industrial activities. All three of these systems have known software deficiencies which limit productivity and require cumbersome manual workarounds. Historically to effectively operate and meet mission needs, the naval shipyards and RMCs have supplemented this suite with additional local spreadsheet and databases, adding to the complexity of replacing this aging solution. One goal of the SPF Upgrade is to eliminate these ad hoc databases and unify the solution to effectively operate in the targeted navy data center environment. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The SPF Upgrade is part of the Service Life Extension that will address the accumulation of significant problems with this system, update the software platform, provide integrated metrics capabilities across naval shipyards and include accessibility of data by planners at headquarters. The SPF Upgrade will modernize the database architecture to provide fully functioning data warehouse environment that will eliminate the weekend long running of PMC jobs that hinders efficiency and productivity. The Upgrade will eliminate the currently required manual interfaces with other NMMES systems to produce a seamless real-time environment that can accommodate all project management metrics, as well as all ship maintenance related metrics. Additionally, it will eliminate the manual data gathering and consolidation efforts required to produce Shipyard Interim Metrics; and eliminate the need for Headquarters and each shipyard to maintain their own unique respective standalone data files.<br><br>***FY 2019 Plans:***<br>Complete development and configuration of upgrade, and begin Government Acceptance Testing of SPF upgrade in preparation for FY19 deployment and implementation. Complete design for configuration on the QPS and PMC components.<br><br>***FY 2020 Base Plans:***<br>Begin configuration and integration of the QPS and PMC components. Initiate testing of the end-to-end business processes in the toolset.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase of $0.99M in FY 2020 reflects transition from software development to project configuration/ integration tasks. FY 2019 is focused on the SPF tool, FY 2020 will concentrate on incorporating the QPS and PMC components in the forecasting and earned value management tools in the public shipyards. Upgrading SPF as well as the QPS and PMC tools is required to eliminate proprietary, end-of-life software from the NMMES product line and continue compilation of metrics for dry-dock and maintenance production planning and forecasting. | | | | | |
| ***Title:*** NMMES Technical Refresh (NMMES-TR) | 16.970 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Funding was moved to PU 3432 of PE 0605013N starting in FY19. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The current Navy Maritime Maintenance Enterprise Solution (NMMES) toolset enables the execution of submarine, aircraft carrier, and surface ship maintenance and repair for the Naval Shipyards (NSY), Intermediate Maintenance Facilities (IMF), Regional Maintenance Centers (RMC), and Ship Repair Facilities (SRF). It consists of a family of systems and applications that are at (or nearing) their end-of-life. These systems and applications support a workforce of over 51,000 worldwide and enable approximately $9.5B per year of maintenance and repair work. The Workforce Management and Financial Management systems were removed from the NMMES TR scope by the Analysis of Alternative (AoA) Preferred Alternative, and will continue operation and sustainment as part of the NMMES portfolio. The critical business processes to schedule, execute, monitor, certify work, and pay employees at each activity are codified within the Information Technology (IT) toolset; there is no manual alternative. Annual efforts to restore the NMMES budgets to meet requirements have only been partially successful and have required multiple annual supplemental actions to address deficiencies. The urgency to modernize these systems has grown every year as deferred upgrades and underfunded sustainment has led to the current state of the NMMES toolset.<br><br>The NMMES-TR is a pre-Milestone A acquisition program that will provide a sustainable enterprise IT solution leveraging Commercial, Off-The-Shelf (COTS) technology and business processes for shore maritime maintenance, which also standardizes processes and tools. Unlike the uniquely custom designed status quo toolset, the NMMES-TR solution will not implement product customization to match the current maintenance business processes; but rather, maintenance business processes will be modified to match the solution, thereby adopting industry best practices. Accordingly, the solution will be more flexible to the BPR process, and more agile to capitalize on efficiency improvement opportunities and innovations. This will facilitate alignment with the Optimized Fleet Response Plan (OFRP) by assisting the maintenance activities with accomplishing assigned tasks as planned in order that submarines, aircraft carriers, and surface ships can properly train and deploy on schedule. NMMES-TR will also provide a modern solution that will be more effective and efficient in combating cybersecurity threats, and capable of continuous monitoring. The actual solution will be formed after the Analysis of Alternatives (AoA).<br><br>***FY 2019 Plans:***<br>Funding for this requirement has been realigned to PU 3432 beginning in FY 2019.<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A | | | | | |
| ***Title:*** Financial Technical Upgrade | 4.910 | 3.590 | 2.320 | 0.000 | 2.320 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** The NMMES Family of Systems has two primary systems that are financial feeders; 1) SYMIS Mission Funded COST (aka COST) system which processes cost related data for mission funded activities with the Standard Accounting & Reporting System - Field Level (STARS-FL); and 2) the SYMIS Pre & Post Payroll Processes system which manages the Time & Attendance data from the NMMES Family of Systems to the Defense Civilian Payroll System (DCPS). These systems are targeted for modernization to address the FOUR mandatory requirements: 1) meeting FISCAM and auditability requirements; 2) transitioning COST to interface with SABRS, vice STARS-FL no later than 30 September 2018; 3) both these systems are COBOL-based. COST utilizes a 1990s era Case tool (PACBASE) to generate COBOL-ready code. In 2015, vendor support for the PACBASE tool was transitioned to an IBM subsidiary in France (who in 2016 informed the Navy that support for the tool would end by 2018), hence without this tool the COST system cannot be updated and therefore must be refreshed in order to operate; and 4) the rapid increase in the cost of gaining sufficient COBOL licenses to operate these two systems in support of fleet maintenance has also created emerging execution year budget challenges for the Navy to such an extent that it is now more feasible to immediately transition these systems to a non-COBOL solution than to continue in the current licensing structure. The Financial Technical Upgrade addresses these four urgent needs in order to continue operation of the NMMES Family of Systems beyond 2018.

***FY 2019 Plans:***
Complete the software development for the modernized COST & PPPP systems, and begin planning for Government Acceptance Testing (GAT).

***FY 2020 Base Plans:***
Conduct Government Acceptance Testing (GAT) and complete software bug fixes and integration corrections for the Standard Accounting Budget and Reporting System (SABRS). Complete training and deployment.

***FY 2020 OCO Plans:***
N/A

***FY 2019 to FY 2020 Increase/Decrease Statement:***

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY20 $1.270M budget decrease reflects the transition from testing and integration to the deployment phase at the end of the project. | | | | | |
| ***Title:*** Material Management Upgrade | 5.250 | 4.750 | 2.773 | 0.000 | 2.773 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The Material Access Technology-Mission Funded (MATmf) application is used by all Naval Shipyards to manage and provide logistical support for services and materials manufactured, purchased and utilized in the overhaul, repair, and maintenance of ships and submarines. MATmf provides quantitative, financial, and status information on industrial materials. It monitors the shop stores in the shipyard and assesses the direct material inventories.<br>MATmf has reached end-of-life and is operating on software components that are considered obsolete. A Service Life Extension is required to support the future capabilities (i.e. eTWD requirements), to correct sustainability issues, and to improve the ability to support current and future ships maintenance. While the upcoming MSE releases will consolidate application databases (including MATmf into a data center environment); it does not include material integration across shipyards nor provide usable real time material information or metrics across the ship maintenance community. The MSE releases will also not convert the outdated development code, eliminate the time cumbersome manual batch processing, nor fix a host of long term shortcomings affecting the efficiency of MATmf (including long time printing limitations affecting Material Control Tags and waterfront performance). Over the past 5 years, NAVSEA 08 and the Corporate Material Process Action Team through multiple LEAN events has identified and documented many areas in MATmf that need enhancement to improve effectiveness. Some of these requirements include: 1) the ability to allow for Fiscal Year rollover of JMLs, 2) the ability to allow redistribution of bulk receipt inspected materials to other shipyards, 3) the ability to report transactions for BP28 assets, 4) improve the ability to create efficient processes for receipt of RFI tagged material into Shop Stores, 5) improve receipt of shipyard contracts into shipyard for receipt inspection, 6) allow DLR material in Shop Stores, 7) address transition to another handheld scanner as the current handhelds are no longer available for purchase. These deficiencies will be addressed in the Material Management Upgrade. | | | | | |
| ***FY 2019 Plans:***<br>Conduct software development efforts and begin Government Acceptance Testing (GAT) of the developed solution. Conduct Integration testing to insure the planned solution satisfactorily integrates with the NMMES Family of Systems. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue testing and integration of configuration changes with the other NMMES applications. Complete design and integration plans for interfaces with NAVSUP and Defense Logistics Agency material supply systems in preparation for final deployment and implementation in FY21.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 $1.977M budget decrease reflects transition of project from development to testing/deployment tasks. | | | | | |
| ***Title:*** NMMES -- Maritime Systems Environment (MSE) -- Database Optimization | 2.432 | 3.205 | 1.980 | 0.000 | 1.980 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The NMMES Family of Systems is presently undergoing a Service Life Extension (SLE) to address cyber security deficiencies, consolidate and align databases across multiple data instances, and to transition the solution into an approved Navy Enterprise Data Center. Once the transition to the NEDC is complete and has reached stability the Database will be optimized to gain throughput efficiencies, capitalize of economies of scale, rationalize data structures to streamline the use of authoritative data and to provide standardized access to data across the fleet maintenance enterprise.<br>***FY 2019 Plans:***<br>Complete database structuring and begin Government Acceptance Testing (GAT) and independent validation of database performance.<br>***FY 2020 Base Plans:***<br>Complete Government Acceptance Testing (GAT) and integration within toolset. Complete database validation efforts and deploy within the NMMES toolset.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 Project decreased by $1.225: The FY 2020 funding request was reduced by $6.917 million to account for the availability of prior year execution balances. Funding was moved to FY21 & FY22. Integration with the training and qualification management toolset will be delayed until FY21. Certification of training credentials for shipboard work will be executed manually until FY21. | | | | | |
| ***Title:*** SUPDESK - Timekeeping For All | 2.700 | 0.000 | 1.100 | 0.000 | 1.100 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The current timekeeping system (SUPDESK) at the shipyards allows managers to input time for their employees. This is considered a financial compliance issue and requires the system be adjusted to allow all shipyard workers to input and certify their individual time. Will also add the capability to track and certify overtime approvals. Supports efforts to close a financial audit finding.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Continue integration, begin training and deployment and activities.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 Project increased by $1.0M: Supports software development and integration with NMMES; train users in preparation for deployment at the Naval Shipyards and Regional Maintenance Centers. | | | | | |
| ***Title:*** Local Application Rationalization | 2.162 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Rationalize and down select to a subset of applications after assessing local applications in the shipyards and Regional Maintenance Centers (RMCs). Down-select to a common core set and standardize the functionality across the enterprise. There are numerous local applications at the shipyards that need to be rationalized into several "best of breed" as the Maritime Systems Environment (MSE) is deployed. This requires reviewing all local application functionality and determining which applications should be migrated.<br>***FY 2019 Plans:***<br>Tasks include; configuring and beginning Government Acceptance Testing (GAT) of integration of best of breed selections with NMMES/MSE, training users and deploying to at the Naval Shipyards and Regional Maintenance Centers (RMCs). Gain product stabilization by addressing user feedback and identifying software deficiencies.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:*** | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>N/A | | | | | |
| ***Title:*** MSE Waterfront Process Improvement<br>***Articles:***<br>***Description:*** The Maritime Systems Environment (MSE) Waterfront Processes Improvement Upgrade is focused on accelerating LEAN process improvement recommendations from industrial Process Action Teams into the embedded processes contained in the MSE. This is a multi-year initiative to not only address the backlog of LEAN recommendations in the ship maintenance community, but to also provide the impetus to accelerate the development of additional process improvements to gain further economies in the maintenance community.<br>***FY 2019 Plans:***<br>Prioritize mature LEAN finding based on best return on investment and begin analysis for integration into MSE. Structure improvements into series of Releases aligned with the MSE regular update cycle in order to accelerate delivery of capability to users.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Project funding decreased by $1.00: FY19 process improvements will be implemented and the project will resume in FY21 | 0.000<br>- | 1.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Enterprise Data Analytics<br>***Articles:***<br>***Description:*** Establish capability to fully utilize navy authoritative maintenance data to develop predictive analysis and gain efficiencies in ship availabilities.<br>***FY 2019 Plans:*** | 0.000<br>- | 2.714<br>- | 1.113<br>- | 0.000<br>- | 1.113<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Finalize functional and business process analysis and market analysis of commercial products. Select commercial package(s) and begin configuration and integration planning.<br>***FY 2020 Base Plans:***<br>Continue integration and configuration of selected toolset(s).<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY20 Project decreased by $.0.887: Configuration activities will be reduced delaying implementation of the advanced information and reporting capabilities intended to assist the increase in the readiness generation. | | | | | |
| ***Title:*** Product Data Management Integration | 0.000 | 7.167 | 2.470 | 0.000 | 2.470 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Modify the NMMES solution to be able to utilize the 3-D Product model information being delivered to the Navy by the shipbuilders for the Ford and Columbia Classes. Both the Ford Class Carrier and Columbia Class Submarine Programs are being designed, built and delivered utilizing 3-D integrated product models. Configuration and technical information will be provided to the government in electronic format rather than via paper-based drawings. The current suite of Shore Maintenance Systems cannot accept the data delivered by either program, which will impact the ability of the shore Maintenance Community to maintain and modernize these platforms. This is required to support the USS FORD Planned Incremental Availability (PIA) at Norfolk Naval Shipyard as well as future maintenance availabilities on both classes.<br>***FY 2019 Plans:***<br>Begin analysis and integration planning of the selected tool with NAVSEA PEOs and shipbuilders. Configure the new tool and integrate with the NMMES product line. Perform software testing and train users at the Naval Shipyards.<br>***FY 2020 Base Plans:***<br>Continue configuration, integration, and testing activities. Correct deficiencies identified during the testing processes.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY19 increased by $0.757M as the maintenance community fine tuned requirements needed to support FORD and COLUMBIA Class work. This project decreases by $3.94M from FY 2019 to FY 2020. Initial project planned to start in FY 2019 based on program acquisition schedules of Ford Class Carrier and Columbia Class Submarine Programs. FY 2019 initiated procurement and configuration of the product as well as the changes required in the NMMES program to align with the Product Data Management toolset. This project will continue configuration and testing in preparation for initial deployment in FY 2020. This project will require multiple interfaces internal to the NMMES product line as well as to external sources for product model configuration and change management to align with ship baseline configuration. | | | | | |
| ***Title:*** Mobility Solutions<br>***Articles:***<br><br>***Description:*** Establish a "go everywhere" capability for the NMMES system at the Regional Maintenance Centers and Naval Shipyards. Include the capability to retrieve authoritative information across multiple, secure devices, (i.e. tablets, digital readers, scanners, etc.) to continue to exploit a paperless arena.<br><br>***FY 2019 Plans:***<br>Begin analysis and planning, including security considerations. Begin device integration and capability demonstrations.<br><br>***FY 2020 Base Plans:***<br>N/A.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY19 increased by $0.059M based on refined workload planning. FY20 budget decrease of $0.805M is due to the scheduled ramp down in alignment with eTWD deployment plans. | 0.000<br>- | 0.864<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 49.600 | 35.382 | 15.696 | 0.000 | 15.696 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

**D. Acquisition Strategy**

The backbone of the present solution is a set of dated information technology (IT) products that are approaching end-of-life. In order to ensure that the IT toolset would continue functioning as required the Fleet Maintenance Board of Directors approved the establishment of the NAVSEA PMO-IT to oversee the selected development and sustainment efforts of this solution; to acquire and manage the IT resources necessary to gain further efficiencies in the systems; and to transition this solution to a more modern and efficient end state. Selected systems modernizations are aligned with ongoing systems sustainment to provide an IT solution until a Commercial of the Shelf (COTS) based Technical Refresh of this solution can be completed and deployed. Existing IT contracts will be used for sustainment services and new contracts will be put in place to support NMMES TR services, utilizing existing delivery orders where feasible.

**E. Performance Metrics**

System performance is measured using the following:
A. Operational Availability (A_o): Percent of time systems are available for use.
(1) Mean Down Time (MDT) is the mean time the system will be down to start and complete maintenance and corrective task.
MDT = (Total Down Time)/(Total Number of Maintenance). Measure of Performance (MOP): Total Down Time : 87.6 Hrs/Year.
(2) Mean Time Between Maintenance (MTBM) is the mean time between maintenance, all corrective and preventive maintenance. MTBM = (Total Up Time)/(Total Number of Maintenance). MOP: A_o = MTBM / (MTBM+MDT) > 0.99.
B. Reliability: Ability of a system to perform its mission without failure or degradation under a prescribed set of operating conditions.
(1) Mean Time Between Failure (MTBF) is the mean time between unforeseen system failures which result in substantial loss in users' productivity, including being off-line unscheduled. MTBF = (Total Up Time)/(Total Number of Failures). MOP: MTBF > 3504 Hours
(2) Mean Time To Repair (MTTR) is the mean time to perform the corrective maintenance to repair the failure. MTTR = (Total Down Time for corrective maintenance)/(Total Number of Failures). MOP: MTTR less than or equal to 16 Hours.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | C/CPFF | NAVSEA : WNY, D.C. | 136.270 | 32.630 | Oct 2017 | 35.382 | Oct 2018 | 15.696 | Oct 2019 | - | | 15.696 | Continuing | Continuing | Continuing |
| Software Development | WR | NSLC : Mechanicsburg, PA | 15.999 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Advance Planning Analysis | WR | SPAWAR : Arlington, VA | 7.471 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.471 | - |
| Advance Planning Analysis | TBD | NAVSEA : WNY, D.C. | 16.504 | 16.970 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.474 | - |
| Advance Planning Analysis | TBD | NSWC PHD : Port Hueneme, CA | 5.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.000 | - |
| | | **Subtotal** | 181.244 | 49.600 | | 35.382 | | 15.696 | | - | | 15.696 | Continuing | Continuing | N/A |

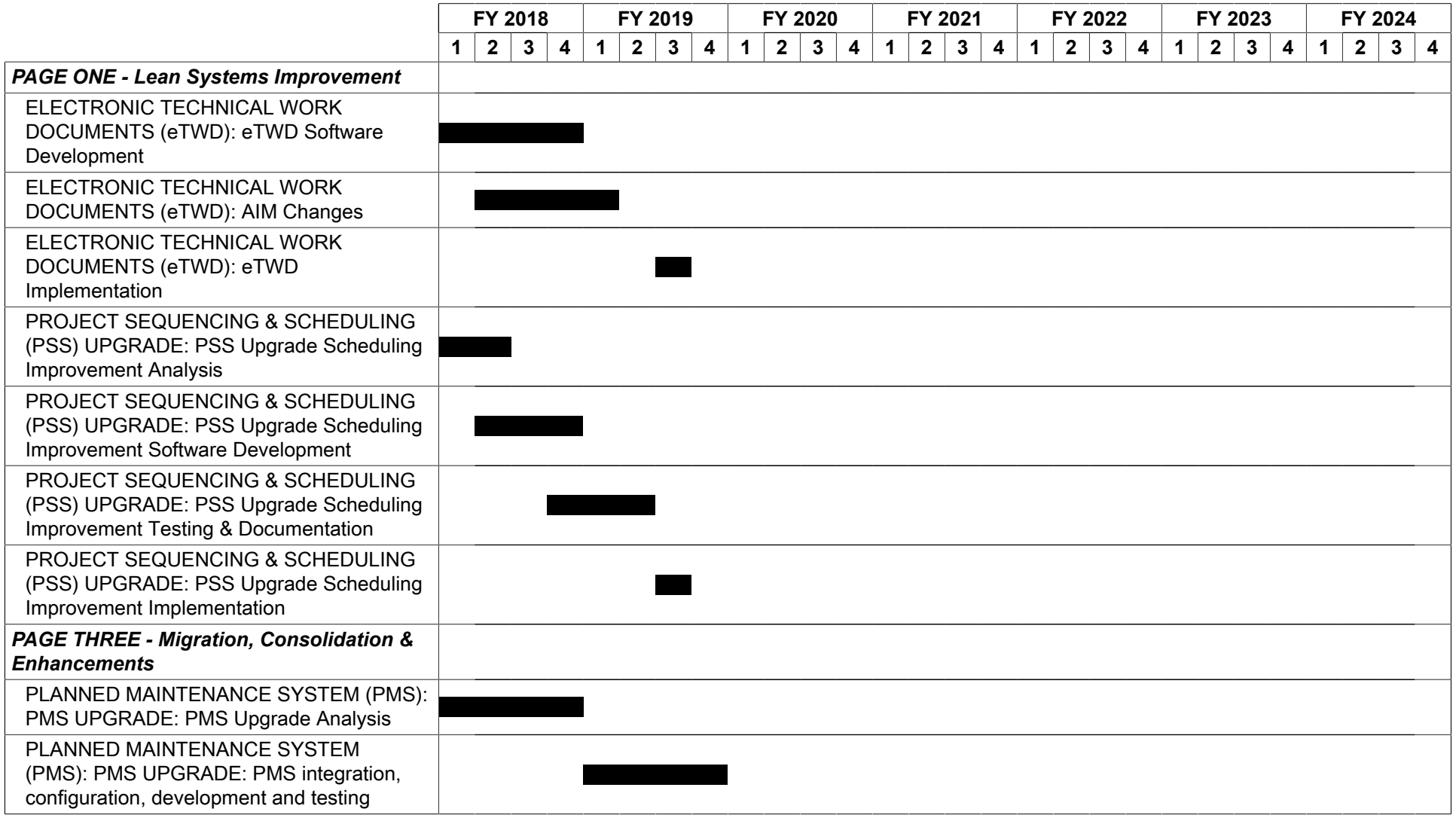
**Remarks**

Program plans to execute all contract awards for software development of shipyard and national systems through the NAVSEA SEAPORT vehicle and other competitively awarded contracts.

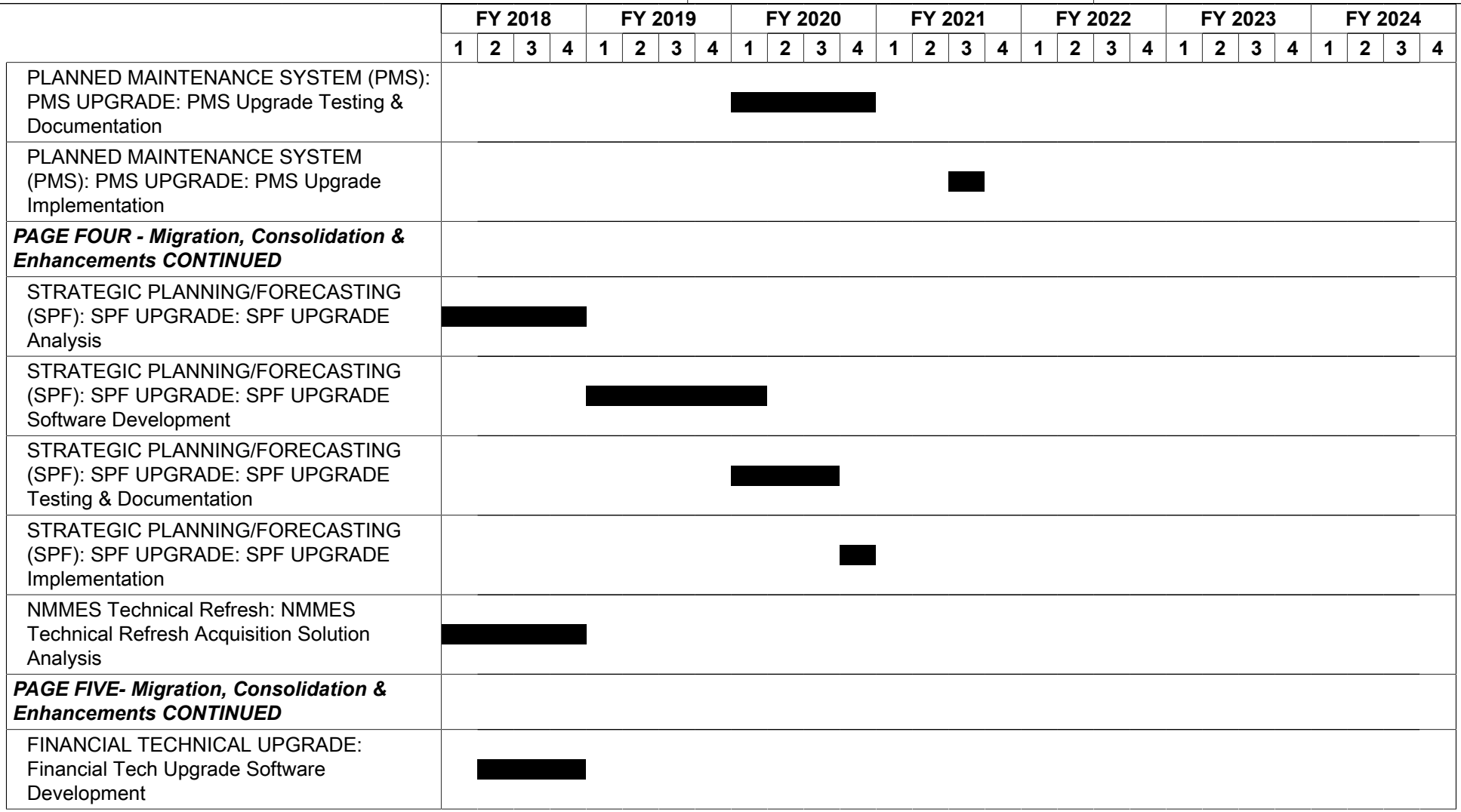
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 181.244 | 49.600 | | 35.382 | | 15.696 | | - | | 15.696 | Continuing | Continuing | N/A |

**Remarks**

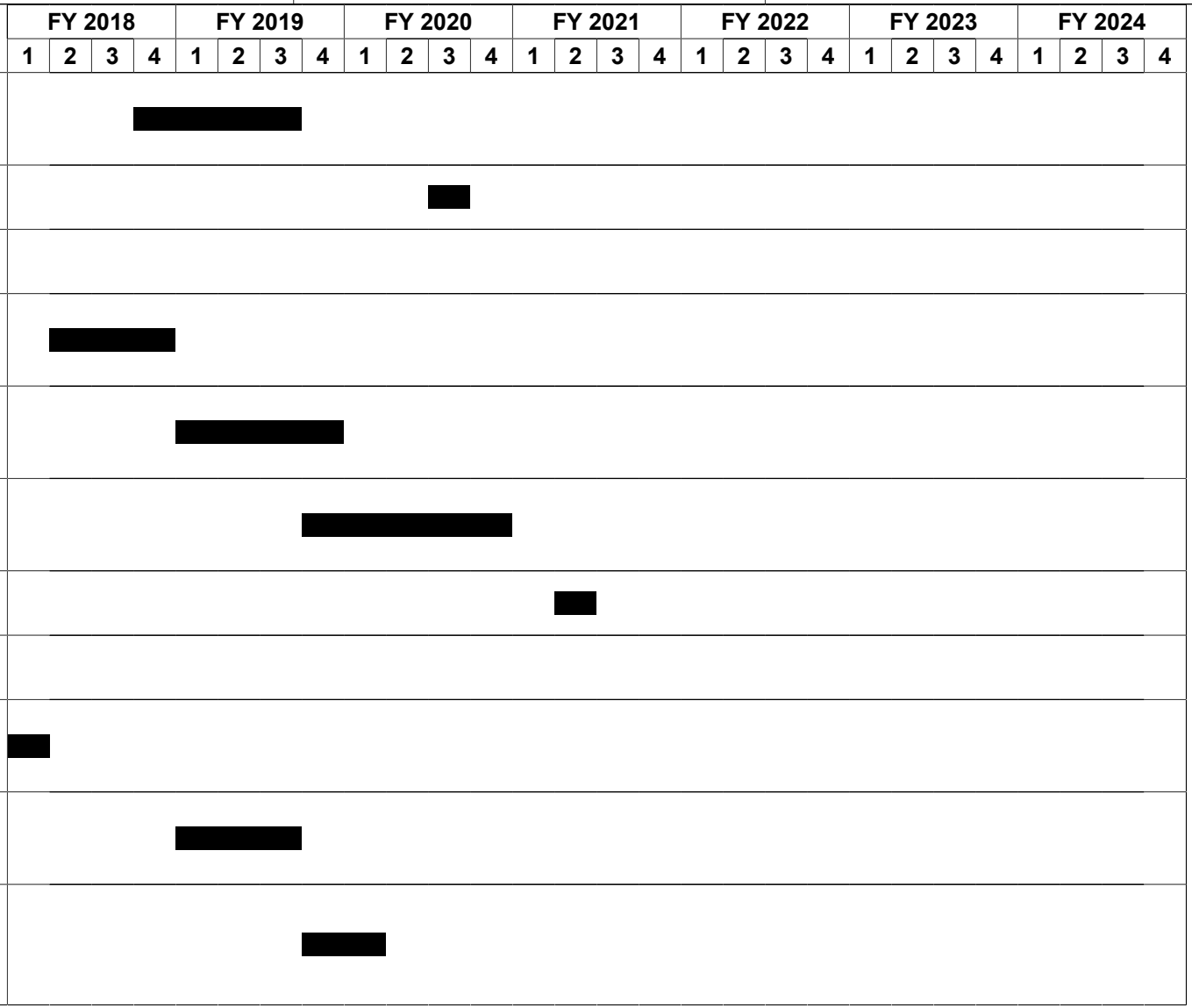
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |



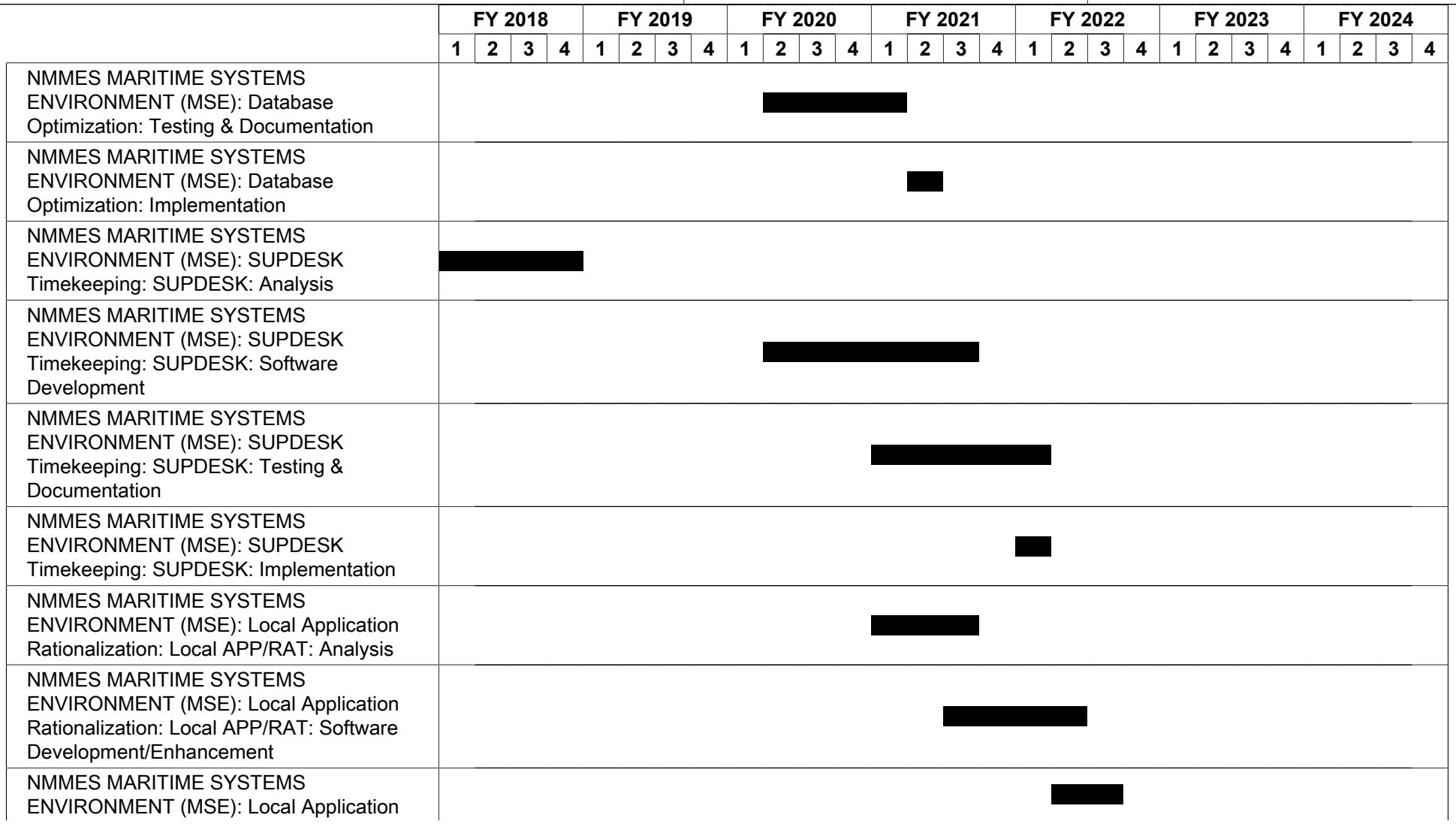
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |



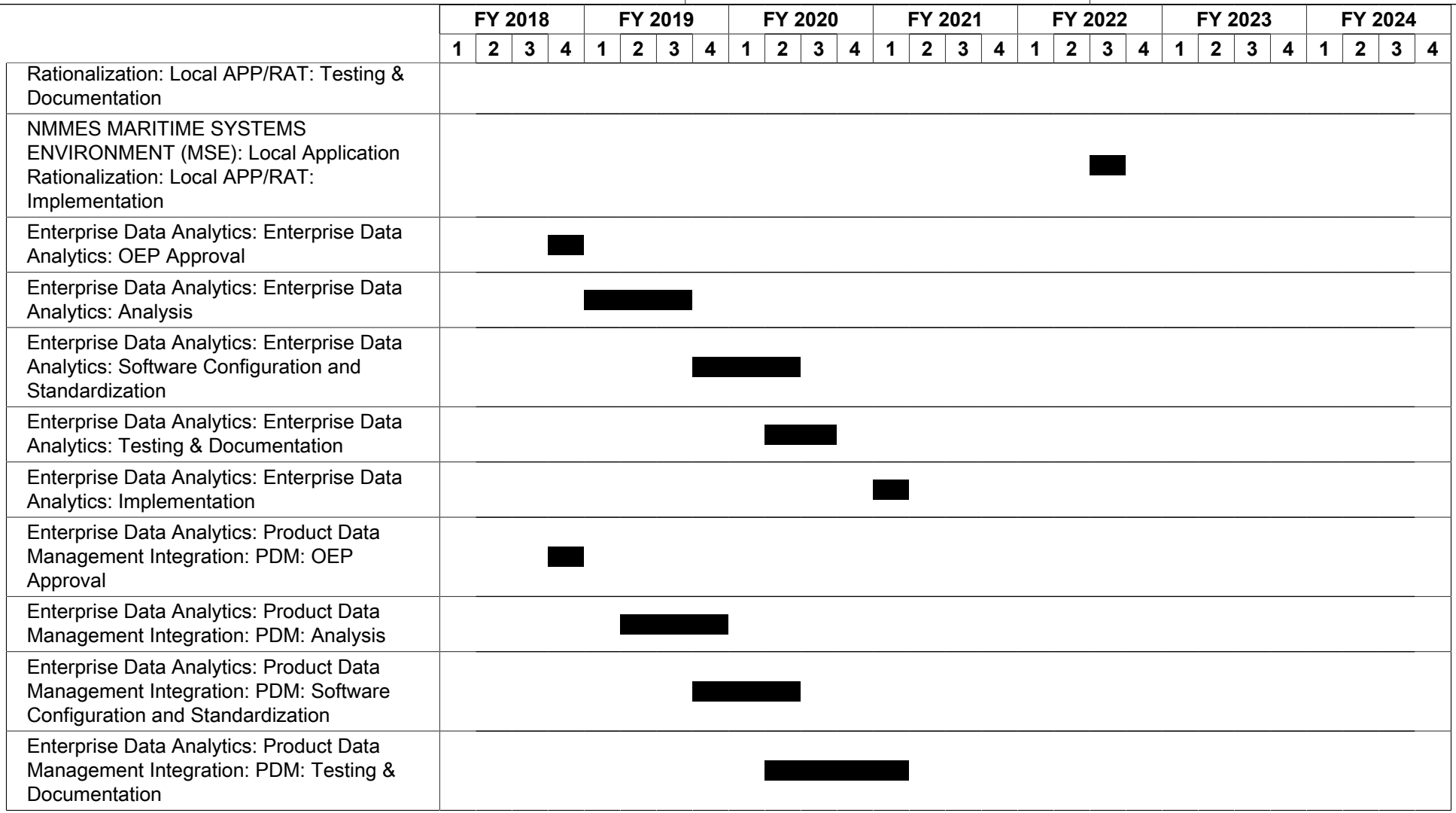
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |



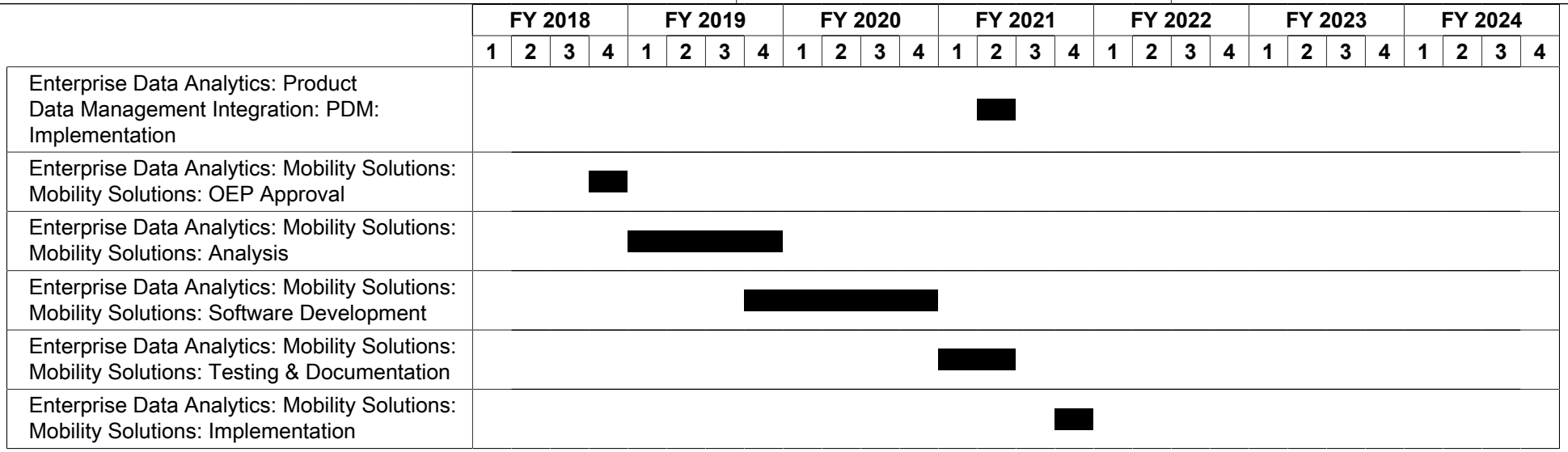
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***PAGE ONE - Lean Systems Improvement*** | | | | |
| ELECTRONIC TECHNICAL WORK DOCUMENTS (eTWD): eTWD Software Development | 1 | 2018 | 4 | 2018 |
| ELECTRONIC TECHNICAL WORK DOCUMENTS (eTWD): AIM Changes | 2 | 2018 | 1 | 2019 |
| ELECTRONIC TECHNICAL WORK DOCUMENTS (eTWD): eTWD Implementation | 3 | 2019 | 3 | 2019 |
| PROJECT SEQUENCING & SCHEDULING (PSS) UPGRADE: PSS Upgrade Scheduling Improvement Analysis | 1 | 2018 | 2 | 2018 |
| PROJECT SEQUENCING & SCHEDULING (PSS) UPGRADE: PSS Upgrade Scheduling Improvement Software Development | 2 | 2018 | 4 | 2018 |
| PROJECT SEQUENCING & SCHEDULING (PSS) UPGRADE: PSS Upgrade Scheduling Improvement Testing & Documentation | 4 | 2018 | 2 | 2019 |
| PROJECT SEQUENCING & SCHEDULING (PSS) UPGRADE: PSS Upgrade Scheduling Improvement Implementation | 3 | 2019 | 3 | 2019 |
| ***PAGE THREE - Migration, Consolidation & Enhancements*** | | | | |
| PLANNED MAINTENANCE SYSTEM (PMS): PMS UPGRADE: PMS Upgrade Analysis | 1 | 2018 | 4 | 2018 |
| PLANNED MAINTENANCE SYSTEM (PMS): PMS UPGRADE: PMS integration, configuration, development and testing | 1 | 2019 | 4 | 2019 |
| PLANNED MAINTENANCE SYSTEM (PMS): PMS UPGRADE: PMS Upgrade Testing & Documentation | 1 | 2020 | 4 | 2020 |
| PLANNED MAINTENANCE SYSTEM (PMS): PMS UPGRADE: PMS Upgrade Implementation | 3 | 2021 | 3 | 2021 |
| ***PAGE FOUR - Migration, Consolidation & Enhancements CONTINUED*** | | | | |
| STRATEGIC PLANNING/FORECASTING (SPF): SPF UPGRADE: SPF UPGRADE Analysis | 1 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| STRATEGIC PLANNING/FORECASTING (SPF): SPF UPGRADE: SPF UPGRADE Software Development | 1 | 2019 | 1 | 2020 |
| STRATEGIC PLANNING/FORECASTING (SPF): SPF UPGRADE: SPF UPGRADE Testing & Documentation | 1 | 2020 | 3 | 2020 |
| STRATEGIC PLANNING/FORECASTING (SPF): SPF UPGRADE: SPF UPGRADE Implementation | 4 | 2020 | 4 | 2020 |
| NMMES Technical Refresh: NMMES Technical Refresh Acquisition Solution Analysis | 1 | 2018 | 4 | 2018 |
| ***PAGE FIVE- Migration, Consolidation & Enhancements CONTINUED*** | | | | |
| FINANCIAL TECHNICAL UPGRADE: Financial Tech Upgrade Software Development | 2 | 2018 | 4 | 2018 |
| FINANCIAL TECHNICAL UPGRADE: Financial Tech Upgrade Testing & Documentation | 4 | 2018 | 3 | 2019 |
| FINANCIAL TECHNICAL UPGRADE: Financial Tech Upgrade Implementation | 3 | 2020 | 3 | 2020 |
| ***PAGE SIX- Migration, Consolidation & Enhancements CONTINUED*** | | | | |
| MATERIAL MANAGEMENT UPGRADE: Material Mgmt Upgrade Analysis for COST Replacement | 2 | 2018 | 4 | 2018 |
| MATERIAL MANAGEMENT UPGRADE: Material Mgmt Upgrade Software Development | 1 | 2019 | 4 | 2019 |
| MATERIAL MANAGEMENT UPGRADE: Material Mgmt Upgrade Testing & Documentation | 4 | 2019 | 4 | 2020 |
| MATERIAL MANAGEMENT UPGRADE: Material Mgmt Upgrade Implementation | 2 | 2021 | 2 | 2021 |
| ***PAGE SEVEN- Migration, Consolidation & Enhancements CONTINUED*** | | | | |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Database Optimization: OEP Approval | 1 | 2018 | 1 | 2018 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Database Optimization: Analysis | 1 | 2019 | 3 | 2019 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Database Optimization: Software Configuration and Standardization | 4 | 2019 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Database Optimization: Testing & Documentation | 2 | 2020 | 1 | 2021 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Database Optimization: Implementation | 2 | 2021 | 2 | 2021 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): SUPDESK Timekeeping: SUPDESK: Analysis | 1 | 2018 | 4 | 2018 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): SUPDESK Timekeeping: SUPDESK: Software Development | 2 | 2020 | 3 | 2021 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): SUPDESK Timekeeping: SUPDESK: Testing & Documentation | 1 | 2021 | 1 | 2022 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): SUPDESK Timekeeping: SUPDESK: Implementation | 1 | 2022 | 1 | 2022 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Local Application Rationalization: Local APP/RAT: Analysis | 1 | 2021 | 3 | 2021 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Local Application Rationalization: Local APP/RAT: Software Development/Enhancement | 3 | 2021 | 2 | 2022 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Local Application Rationalization: Local APP/RAT: Testing & Documentation | 2 | 2022 | 3 | 2022 |
| NMMES MARITIME SYSTEMS ENVIRONMENT (MSE): Local Application Rationalization: Local APP/RAT: Implementation | 3 | 2022 | 3 | 2022 |
| Enterprise Data Analytics: Enterprise Data Analytics: OEP Approval | 4 | 2018 | 4 | 2018 |
| Enterprise Data Analytics: Enterprise Data Analytics: Analysis | 1 | 2019 | 3 | 2019 |
| Enterprise Data Analytics: Enterprise Data Analytics: Software Configuration and Standardization | 4 | 2019 | 2 | 2020 |
| Enterprise Data Analytics: Enterprise Data Analytics: Testing & Documentation | 2 | 2020 | 3 | 2020 |
| Enterprise Data Analytics: Enterprise Data Analytics: Implementation | 1 | 2021 | 1 | 2021 |
| Enterprise Data Analytics: Product Data Management Integration: PDM: OEP Approval | 4 | 2018 | 4 | 2018 |
| Enterprise Data Analytics: Product Data Management Integration: PDM: Analysis | 2 | 2019 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2904 / *NAVSEA IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Enterprise Data Analytics: Product Data Management Integration: PDM: Software Configuration and Standardization | 4 | 2019 | 2 | 2020 |
| Enterprise Data Analytics: Product Data Management Integration: PDM: Testing & Documentation | 2 | 2020 | 1 | 2021 |
| Enterprise Data Analytics: Product Data Management Integration: PDM: Implementation | 2 | 2021 | 2 | 2021 |
| Enterprise Data Analytics: Mobility Solutions: Mobility Solutions: OEP Approval | 4 | 2018 | 4 | 2018 |
| Enterprise Data Analytics: Mobility Solutions: Mobility Solutions: Analysis | 1 | 2019 | 4 | 2019 |
| Enterprise Data Analytics: Mobility Solutions: Mobility Solutions: Software Development | 4 | 2019 | 4 | 2020 |
| Enterprise Data Analytics: Mobility Solutions: Mobility Solutions: Testing & Documentation | 1 | 2021 | 2 | 2021 |
| Enterprise Data Analytics: Mobility Solutions: Mobility Solutions: Implementation | 4 | 2021 | 4 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>2905 / *BUPERS IT* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2905: *BUPERS IT* | 82.761 | 24.995 | 89.306 | 167.765 | - | 167.765 | 167.918 | 83.365 | 64.424 | 65.712 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Research and Development Funds for MPT&E Transformation under PE 0604703N have been consolidated within PE 0605013N PU 2905 starting in FY19.

This effort is the linchpin of the Navy's MPT&E (Manpower, Personnel, Training & Education) Business IT Transformation strategy which stems from the decision to invest in programs that directly align with the Sailor 2025 vision. The current 70-year-old business processes and 40-year-old obsolete IT systems will not sustain Fleet anticipated growth and is not cost efficient nor effective. The Transformation strategy involves revolutionary change by rapid implementation of MPT&E Business IT products using the Industry Best Practices Model (e.g., early investment for largest ROI, rapid prototyping, and vanilla COTS products usage.) Four projects are the cornerstones of the N1 Transformation strategy. The Navy Standard Integrated Personnel System (NSIPS) will become Navy Personnel and Pay (NP2) and includes personnel and pay modernization, a Customer Relations Management (CRM) solution, and the collapse of Legacy Manpower System functionality. Second, a Single Point of Entry (SPOE) for Sailor self-service is composed of My Navy Portal (MNP); Mobile Applications and Services; and Identity and Access Management (IdAM). Third, MPT&E Core Learning Stack improves the accessibility, sophistication, and collaborative nature of educational outreach. Finally, the Authoritative Data Environment (ADE) will enable the collapse of 9 legacy data warehouses into a single, authoritative source of truth for Sailors and Navy decision makers. Additionally, ADE will enable modern data analytics and business intelligence capabilities, taking advantage of current state of practice cloud services, to be leveraged in addressing the Navy's current challenges.

NAVY PERSONNEL AND PAY (NP2)

A 2015 analysis of alternatives for integration of personnel and pay capabilities recommended the use of Oracle PeopleSoft 9.2 with Global Payroll for achieving the Navy's Personnel and Pay IT needs. Follow-on analysis conducted as part of the MPT&E transformation efforts in 2016 and 2017 indicated that the most cost effective approach to achieving the Transformation goals of modernizing HR Business System IT consistent with industry best practices was de-customization of the Navy Standard Integrated Personnel System (NSIPS) which uses Oracle PeopleSoft as its core technology, integration with Global Payroll, use of General Ledger to maximize auditability and accounting functions and hosting of the integrated solution. Navy Personnel and Pay (NP2) will sustain and develop the core system of systems architecture; executing pilot programs and iterative development of capabilities for Navy's MPT&E Transformation.

The NP2 increase in FY20 supports the de-customization of NSIPS and integration of Direct to Treasury Pay Capability via Pay Modernization (Pay Mod). This combined effort (named NP2) will result in a vanilla Commercial Off the Shelf, cloud hosted, integrated personnel and pay solution that will provide the Navy with an IT system that is modern, highly automated, auditable, and more efficient.

1. Complete end-to-end Application Functional Testing (AFT) for the NP2 Rapid Prototype Pilot (RPP).
2. Complete Compile to Combat engagement & experimentation activities for NP2 RPP.
3. Complete first capability drop for NP2 RPP (Street to Fleet functionality).
4. Begin Rapid Fielding Pilot (RFP) #1, the scope of which will include building out pay & personnel capability; interfaces and data exchanges needed for fielding; and operational testing and parallel operations, as well as training activities.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

5. Complete Transition Plan for movement of NP2 to the commercial cloud environment.
6. Complete transition of NP2 from Government Cloud to the commercial cloud environment.
7. Conduct Defense Joint Military System (DJMS) data cleansing in support of transition of Pay functionality to NP2.
8. Conduct deployment planning for NP2 RFP.
9. Conduct design and development sprints for NP2 RFP #1.
10. Conduct SRR/SFR, PDR, CDR, and iterative AFT/ASIT for NP2 RFP #1.
11. Begin planning activities for NP2 RFP #2, the scope of which will include Position Management, Task Analysis, and Manpower Requirements analysis.
12. Realignment of NMRS and BBD functionality/requirements to NP2 RPP.

Implementation of NP2 will result in several key benefits:
1. Improved accuracy and auditability of personnel and pay transactions.
2. Treasury Direct Disbursing eliminating Navy reliance on the sunsetting DJMS system.
3. Improved permeability of Active and Reserve Components to improve accuracy and eliminate delays in pay processing when a member moves between components.
4. Increased automation of common personnel and pay transactions
5. Integration of functionality currently spread across 55 different adhoc and outdated HR Business Systems.

Efforts in FY20 are focused on RPP that will support the remainder of Developmental Testing (including vendor support), Training and Development efforts, and Operational/Parallel Testing with select populations in the fleet. Simultaneously, the RFP Pilot will be occurring for the full FY20 in an Agile methodology covering requirements gathering, development, testing, and support for deployment by Jan 2021. Beginning in FY20 system requirements and functionality for NMRS/BBD/AoA/CRM/ARM will be subsumed under the auspices of NP2 as part of the N1 MPT&E Transformation Effort and system consolidation. The descriptions for those systems are provided below.

BILLET BASED DISTRIBUTION (BBD)
BBD is a Sailor 2025 initiative aimed at modernizing distribution and order writing systems. The effort begins functional work and follow-on development to collapse Navy Reserve Order Writing System (NROWS), Navy Marine Corps Mobilization Processing System (NMCMPS), Enlisted Assignment Information System (EAIS), and Officer Assignment Information System (OAIS) into a single distribution system. The objective of BBD is to increase personnel readiness, improve fit and provide clear visibility to the impact on mission readiness at the billet level. BBD will facilitate maximizing the contributions of every member of the Navy workforce by delivering competency-based career paths. As part of the Navy's transformation initiative, BBD will be consolidated into the MPT&E Navy Personnel and Pay (NP2) System technology component of the transformation effort.

NAVY MANPOWER REQUIREMENTS SYSTEM (NMRS)
NMRS will modernize obsolete software and incorporate a wide array of enhancements (expanded capabilities based on sponsor's approved Functional Requirements Document) of new capabilities in support of Manpower Requirement efficiencies.

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NMRS is a key tool which Navy manpower managers rely on to set, implement, and execute manpower requirements. Recommendations for improving data bases and the Navy's mobilization capacity rely on NMRS to make strength determinations. The planned effort also includes technical evaluation and integration of products produced by the Simulation Toolset for Analysis of Mission, Personnel and Systems (STAMPS) program. As envisioned by the Navy's Transformation initiative, NMRS will eventually be consolidated into the MPT&E Navy Personnel and Pay (NP2) System technology component of the transformation effort.

ANALYSIS OF ALTERNATIVE/ECONOMIC ANALYSIS (AOA)
The Navy will conduct multiple AoAs and studies to analyze viable alternatives in order to determine the most efficient and effective solution to address the modernization of elements of the Navy's Manpower, Personnel, Training and Education (MPT&E) IT portfolio. AOA will assess operational effectiveness, suitability, and costs of non-tactical systems to meet emerging capability requirements.

LEARNING STACK (FORMERLY LEARNING MANAGEMENT SYSTEM - DISTANCE LEARNING (LMS-DL))
Beginning in FY20, LMS-DL is aligned with the Learning Stack (LS) technology component of the N1 Transformation initiative. LMS-DL supports ready relevant learning, with a focus to align Navy learning, create a career learning continuum, and leverage evolving technologies to expand learning solutions when and where the Sailor needs them. This will modernize content that meets Fleet-validated learning needs, to improve Sailor performance and enhance mission readiness. The collaborative learning environment (CLE) is a key component within the learning IT strategy that leverages Commercial-Off-the-Shelf products to integrate the CLE with intelligent tutors, a multi-purpose reconfigurable training system (MRTS), electronic classrooms (ECR), trainers and labs, interactive multimedia instruction (IMI), instructors, and a virtual environment.
As part of the Transformation holistic IT approach, ready & relevant learning requires the development of a Learning Management System that permits:
(1) Mobile & flexible delivery of modular training to the sailor
(2) Synchronization of work requirements with learning modules to ensure proper training is delivered at the right time
FY20 funding will develop and deploy new technologies for modularized training in fleet concentration areas to support the continuum of learning to include:
(1) Development, modification or replacement of the current LMS platform
(2) Integration of Manpower, Personnel, Training and Education (MPT&E) management tools to support end to end business processes (billet information, assignment, distribution, student management, learning management, personnel information, advancement) that will be impacted by changes to learning delivery and career profiles via Progressive NECs (e.g. Legacy systems: TFMMS,NSIPS, Learning Assessment System, Navy Training Management Planning System and future transformation systems: NP2 and ADE.)
The Learning Management tools and supporting IT infrastructure must also be modified to support management of training into the Delayed Entry Program, the growing use of demonstration videos, social media, student and learning management for MPT&E mobility efforts, gaming and simulation technology as it is brought on-line. LMS-DL will also introduce the Learning Continuum Pilot, a risk reduction effort that develops proof of concept alignment of sailor training requirements with learning content delivery.

SINGLE POINT OF ENTRY (SPOE) (FORMERLY MY NAVY PORTAL (MNP))
SPOE is an integrated web portal that consolidates the Navy's Human Resource portals, knowledge, and applications into a single and simplified user experience. Through the use of a multi-phased development approach, SPOE will provide an intuitive self-service capability for Sailors to view and manage their personnel and

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career information. SPOE provides Active and Reserve Sailors with personalized interactive experiences and allows access to relevant information including learning content, human resource applications, and career business processes.
FY20 will support the following new efforts:
1. New challenges within technical development including transactional mobile applications
2. Development and production of commercial cloud based Identity and Access Management (IdAM) services
3. More robust level-of-effort requirement for cybersecurity
4. System and services integration - integration with My Navy Career Center, CRM solution, IdAM, Mobile Apps, and legacy systems

APPLICANT RELATIONSHIP MANAGEMENT (ARM)
ARM provides automated support of the management of recruiting information. ARM enables all levels of recruiting to have real-time access to timely and accurate information. ARM provides managers with decision-making support by consolidating Navy Recruiting Command (NRC) legacy application systems. The complete ARM Systems Dev/Mod effort will incorporate biometrics and paperless implementation across all lines of business systems to gain additional efficiencies. Included in the ARM program is the Self Service Accessions Application (SSAA). Phase II of this effort will build the SSAA application into the ARM system. SSAA is a mobile device-based software application. SSAA supports a change in the NRC business processes from a recruiter-driven business model to an applicant self-service business model. This "app" will be used by applicants to collaborate with recruiters anytime & anywhere to more efficiently and effectively navigate the recruiting process. As envisioned by the Navy's Transformation initiative, ARM will be consolidated into the NP2 Customer Relations Management (CRM) in FY20.

AUTHORITATIVE DATA ENVIRONMENT (ADE)
ADE is part of the Navy's MPT&E IT Transformation initiative aligned directly with the Authoritative Data Environment technology component of the transformation effort. ADE is aimed at transitioning the current project based ADE into a full enterprise solution that is based on modern IT service models and cloud hosting technology. This will advance data analytics and visualization capabilities, and add common platform services in a big data environment that is consistent with private industry. This acceleration toward a true Navy-wide personnel authoritative data environment is a transformational increase in capability for decision support and improving personnel readiness.
As part of the Transformation strategy, the Chief of Naval Personnel has directed expansion and improvements of the ADE in making MPT&E data more available to commanders, sailors, business owners and fleet executive leadership. The ADE provides infrastructure, operations and sustainment of the Navy MPT&E Authoritative Data Warehouse(ADW), enterprise service bus, and web support services.
The capabilities delivered by this funding include:
(1) Completed "golden record" expansion increments
- Data quality
- Governance
- Security
- Data standardization
(2) Increased capabilities for MPT&E supply chain & business operations
- Data discovery
- Advanced visualization tools

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- Predictive analytics
(3) Enhanced architecture to support unstructured data and "big data" analytics
(4) Improved support for future identity management & access for mobile device capability

RISK MANAGEMENT INFORMATION (RMI)
The RMI program is a consolidation of DON risk management requirements into a single Program of Record (POR) to provide modern safety reporting and management capabilities for both active and reserve Navy and Marine Corps commands. RMI enables agile responses to business rule changes, automation of routine actions, improved data integrity, and facilitates self-service for organizations and individuals.
RMI is being developed in three increments of capabilities: Streamlined Incident Reporting (SIR), Safety Program Management (SPM), and Analysis & Dissemination (A&D). A fourth requirement, Portal integration, will be accomplished as part of the development of the three RMI increments since each will be built on the same Commercial Off The Shelf (COTS) platform. Each of these capabilities will be acquired as individual Abbreviated Acquisition Programs using an incremental development approach for reengineered business processes, while consolidating five legacy systems Web-Enabled Safety System (WESS), Enterprise Safety Application Management Systems (ESAMS), Portsmouth Occupational Accident and Illness Reporting System (POAIRS), Medical Mishap and Compensation (MMAC), and Injury Tracker (INJTRK).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Billet Based Distribution (BBD) (Moving to NP2) | 0.400 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>BBD functionality and requirements are being aligned under the Navy Personnel and Pay (NP2) Pillar as part of the MPT&E Transformation effort. | | | | | |
| ***FY 2020 Base Plans:***<br>BBD functionality and requirements are being aligned under the Navy Personnel and Pay (NP2) Pillar as part of the MPT&E Transformation effort. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Learning Stack (LS) (formerly Learning Management System - Distance Learning) | 0.000 | 6.469 | 4.851 | 0.000 | 4.851 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>1. Procure and implement Learning Management System - Distance Learning (LMS-DL) Web Conferencing capability and integrate with existing LMS-DL components to form decentralized learning environment.<br>2. Begin integration of Commercial Off-the-Shelf (COTS) LMS solution with Learning Content Repository. | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 3. Integrate Optimized Scheduler with capability to manage classroom usage.<br>4. Begin development of Game Engine capability harmonizing with LMS components.<br>5. Development and integration of LMS components to support seamless Collaborative Learning Environment (CLE) toolset.<br>***FY 2020 Base Plans:***<br>1. Complete Learning Management System (LMS) Commercial Off-The-Shelf (COTS) implementation<br>2. Complete COTS LMS solution integration with Learning Content Repository.<br>3. Procure and Integrate Scheduler with capability to manage classroom usage.<br>4. Continue Game Engine integration efforts with LMS components.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $1.6M. FY20 decrease due to completion of Learning Management System (LMS) integration effort to support Collaborative Learning Environment (CLE) toolset. | | | | | |
| ***Title:*** Single Point of Entry (SPOE) (formerly My Navy Portal) | 13.063 | 11.145 | 39.477 | 0.000 | 39.477 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>1. Support evolving MNP into a Single Point of Entry (SPOE) as a key component of the MPT&E Transformation efforts.<br>2. Continue the development and integration of portal Career Life Event (CLE) portlet capabilities for Sailors to manage their careers in an intuitive self-service web environment.<br>3. Integrate with MPT&E Transformation plan (system consolidation) in order to streamline MPT&E applications and capabilities. MNP functional users and sponsors continue to refine their priorities for MNP integration with outside systems. Those discrete system integrations require new MNP development/modernization code builds to enable MNP to successfully partner with them.<br>4. Support development of a commercial cloud MNP hosting solution. MNP seeks to migrate from a government cloud hosting platform to a commercial cloud hosting solution.<br>5. Develop several mobile applications as a key component of MPT&E's Sailor Self Service drive. My Navy Portal will serve as the front-end, electronic interface for Sailor ticket requests coming into the center.<br>6. Integrate and serve as a key platform to support the My Navy Career Center, My Navy Self Support Services, and a Customer Relations Management (CRM) solution. | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 7. Assist in establishing a core Identity Access Management program to improve Fleet authorization and security procedures. Software will require modest reconfiguration to meet Navy security parameters.<br>8. Complete Customer Relations Management (CRM) Pilots.<br>***FY 2020 Base Plans:***<br>1. Assist in establishing a core Identity Access Management (IdAM) program to improve Fleet authorization and security procedures. Software will require modest reconfiguration to meet Navy security parameters. The capability will make strong use of a cloud based IdAM solution.<br>2. Support integration of My Navy Portal (MNP) and mobile applications with cloud based Identity and Access Management (IdAM) systems and services to provide non-CAC authentication to OPNAV N1 MPT&E information<br>3. Support development and execution of cyber security documentation, reviews, and processes in support of MPT&E Transformation's Authority to Proceed (ATP) process, NAO's Risk Management Framework (RMF) Authority to Operate (ATO) process, and additional technical system modernization to meet current cyber security requirements<br>4. Continue evolving MNP into a Single Point of Entry (SPOE) as a key component of MPT&E's Transformation efforts. Providing direct integration for Sailors between various MPT&E capabilities allows for a more seamless interaction and lowers the overarching IT footprint. Integration efforts will also necessitate an electronic interface with the My Navy Career Center (MNCC).<br>5. Advance integration of portal Career Life Event (CLE) portlet capabilities for Sailors to manage their careers in an intuitive self-service web environment.<br>6. Plan system consolidations in order to streamline MPT&E applications and capabilities. System integrations require new MNP development/modernization code builds to enable MNP to successfully partner with them.<br>7. Continue migration of MNP from a government cloud hosting platform to a commercial cloud hosting solution.<br>8. Continue developing mobile applications as a key component of OPNAV N1s Sailor Self Service capabilities. This will include the need for additional software that provides high levels of encryption, in addition to device operating system protections and verifications.<br>9. Ensure compliance with National Information Assurance Partnership (NIAP) Protection Profiles through software and testing tools in order to meet leading mobile security protocols and standards<br>10. Partner with OPNAV N1 to integrate and serve as a key platform to support the MNCC and My Navy Self Support Services.<br>***FY 2020 OCO Plans:*** | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase in funding of $28.3M from FY19 ($11.1M to $39.5M) to FY20 can directly be attributed to the increase in scope and scale in which the Single Point of Entry (SPOE) program line is executing against. Increased efforts are directly attributed to:<br><br>1. New challenges within technical development including transactional mobile applications<br>2. Development and production of commercial cloud based Identity and Access Management (IdAM) services<br>3. More robust level-of-effort requirement for cybersecurity<br>4. System and services integration - integration with My Navy Career Center, CRM solution, IdAM, Mobile Apps, and legacy systems | | | | | |
| ***Title:*** Analysis of Alternative Economic Analysis (AOA EA) (Moving to NP2)<br>***Articles:***<br>***FY 2019 Plans:***<br>1. Begin AoA for risk reduction field test study for PersPay<br>***FY 2020 Base Plans:***<br>Beginning in FY20, AoA funding realigned to the Navy Personnel and Pay (NP2) Pillar as part of MPT&E Transformation.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $500K. Beginning in FY20, AoA funding realigned to the Navy Personnel and Pay (NP2) Pillar as part of MPT&E transformation. | 0.000<br>- | 0.500<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Navy Personnel and Pay (NP2) (Formerly NSIPS)<br>***Articles:***<br>***FY 2019 Plans:***<br>Transformation activities include conducting prototypes, testing, integration, and migration to a cloud environment. FY19 efforts include: | 9.937<br>- | 60.092<br>- | 111.237<br>- | 0.000<br>- | 111.237<br>- |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 1. Continuation of the second Field Test / Rapid Pilot Prototype (RPP). Software development life cycle activities to enable desired HR and Payroll operations in a production environment while developing the Treasury Direct Disbursement (TDD) capability.<br>2. Migrate RPP to a secure and accredited commercial cloud hosting solution. The migration allows a development environment for future field tests, prototypes, and pilot projects to help achieve Navy MPT&E Transformation objectives.<br>3. Begin the Navy Enlisted System (NES) and Officer Personnel Information System (OPINS) consolidation efforts.<br>4. Build MPT&E system functionality into a COTS Pay Modernization baseline, which feed into modernized military personnel and pay capabilities and Active Component/Reserve Component (AC/RC) permeability.<br>5. Integration of Bi-Service PeopleSoft license with personnel and pay modernization solution.<br>6. Define scope and minimum attributes for the PERS/PAY solution set<br>7. Develop level A/B/C functional requirements to address the Personnel, Payroll, and Audit business needs across MPT&E to support FOC PERS/PAY capabilities<br>8. Analyze DFAS payroll services/functions and determine feasibility to transition services to Navy<br>9. Complete Meritorious Advancement Program (MAP) functionality<br>10. Realignment of NMRS and BBD functionality/requirements to NP2 RPP. | | | | | |
| ***FY 2020 Base Plans:***<br>NP2 increase in FY20 is aligned with the Navy's MPT&E IT Transformation initiative to develop a technology component that forms an MPT&E Navy Personnel and Pay (NP2) system. Transformation activities that were started in FY18 & FY19 will continue, and include conducting prototypes, testing, and integration. FY20 efforts will complete work on the NP2 Rapid Prototype Pilot (NP2 RPP) and start the NP2 Rapid Fielding Pilot (RFP):<br><br>1. Complete design and development of the PCS Travel theme.<br>2. Complete unit, functional, integration/regression testing and package handoff of the PCS Travel theme.<br>3. Complete development of the Performance theme.<br>4. Complete unit, functional, integration/regression test and package handoff of the Performance theme.<br>5. Complete integration sprints for the NP2 RPP themes.<br>6. Complete Iterative Development Test (DT) and Iterative System Integration Test (SIT) for NP2 RPP themes.<br>7. Testing organizations complete OTS observation for NP2 RPP.<br>8. Capability drop for NP2 RPP (Street to Fleet functionality).<br>9. Training for NP2 RPP | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 10. Limited User Testing (LUT) and Operational Testing for NP2 RPP.<br>11. Parallel processing begins.<br>12. Begin Rapid Fielding Pilot (RFP).<br>13. Conduct design and development sprints for NP2 RFP.<br>14. Begin second Rapid Prototype Pilot (RPP) to cover additional pay elements required to sunset DJMS AC/ RC.<br>15. Complete the consolidation of NES/OPINS functionality into NSIPS<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY20, the funding increase is due to the overlap of two large scale pilots for NP2 (RPP & RFP). Rapid Pilot Prototype (RPP) funding will support the remainder of Developmental Testing (including Vendor support), Training and Deployment efforts, and Operational/ Parallel Testing with select populations in the fleet. Simultaneously, the Rapid Fielding Pilot (RFP) will be occurring for the full FY20 in an Agile methodology covering Requirements gathering, Development, Testing, and support for Deployment by Jan 2021.<br><br>1. RPP will use a rapid prototype approach to deliver pilot for PeopleSoft pay capability; build and demonstrate in production-like environment; delivery of "field-able" capability in the Government Cloud Environment. Maximize use of PeopleSoft 9.2 Human Capital Management (HCM) out of the box and leverage Field Test 1 build.<br>Support Treasury Direct Disbursing (TDD) capabilities including testing and validation of a bi-directional interface with Treasury. Generate pay file to Global Exchange (GEX). Integration testing for RPP.<br><br>2. RFP will design, build and test sprint cycle for residual Pay & Personnel capability. In addition to build out interfaces and data exchanges needed for fielding; Operational Testing and parallel operations, as well as training activities. | | | | | |
| ***Title:*** Risk Management Information (RMI) | 1.058 | 1.100 | 7.000 | 0.000 | 7.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>1. Complete development of RMI Streamlined Incident Reporting (SIR) and Analysis and Dissemination (A&D) requirements | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 2. Begin acquisition planning of RMI Safety Program Management (SPM) and Single Point of Entry (SPOE)<br>***FY 2020 Base Plans:***<br>Investment in development and modernization of predictive analytic system which will provide:<br>1.) Improvements in data analysis<br>2.) Predictive operational safety and risk information<br>3.) Participation in TYCOM near miss reporting processes to share lessons across the force<br>4.) Development of a robust process to assess instances of organizational drift and detect accumulation of accident risk over time<br>5.) Improve data visualization.<br><br>Development of an SPM system/capability that replaces legacy systems and implements to-be process improvements for executing a safety and occupational health (SOH) program across the DON.<br><br>Conduct trade off studies to determine options for providing a portal integration capability.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $5.9M. Funding increase from FY19 to FY20 associated with the following requirements:<br>1. Analysis and Dissemination Development, Modernization, and Integration. Funding to execute A/D mission of providing actionable information to reduce safety incidents. Without the support of more sophisticated analytics to include predictive analytics, Navy will not be able to employ more predictive capabilities to improve safety across the DON in alignment with the SECNAV Strategic Readiness Review.<br>2. Safety Program Management Development and Modernization - Develop and Deploy Safety Program Management functionality. RMI is developing an SPM capability that replaces legacy systems and modernizes interface and capabilities.<br><br>Both initiatives consolidate safety systems, makes it easier to report mishaps, and provides authoritative data to help improve safety conditions. | | | | | |
| ***Title:*** Authoritative Data Environment (ADE) | 0.000 | 10.000 | 5.200 | 0.000 | 5.200 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 1. Establish ADE Functional laboratory Test environment in the cloud.<br>2. ADE architecture in the cloud and migrate the Navy Training Management Planning System (NTMPS) data warehouse (DW) to the cloud. This is the first of nine legacy MPT&E data warehouses being consolidated into ADE.<br>3. Consolidate the Navy Personnel Database (NPDB) data warehouse into the ADE environment. This is the second of nine legacy DWs being consolidated into ADE.<br>4. Consolidate Navy Manpower Program and Budget System (NMPBS) data warehouse into the ADE environment. This is the third of nine legacy MPT&E DWs being consolidated into ADE.<br>***FY 2020 Base Plans:***<br>1. API Gateway fully deployed, continuing the ingest of data from the legacy system consolidation.<br>2. API Center of Excellence function operational to standardize and reuse API enabling a streamlined interface process<br>3. Continue to build out the following capability:<br>A. Migrate ADE BBD Ad Hoc capability<br>B. Migrate FLTMPS capability<br>C. Consolidate NPDB Data Warehouse<br>D. Enable view My Pay Check<br>4. Initial Analytic capability focusing on Supply Chain<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $4.8M. The FY20 RDT&E,N funding decreased by $4.8M from FY19 because of transition into sustainment. The portions of the legacy data warehouses that have been consolidated into the ADE environment will transfer to sustainment. | | | | | |
| ***Title:*** Applicant Relationship Management (ARM) (Moving to NP2) | 0.537 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:*** | | | | | |

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| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No change. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 24.995 | 89.306 | 167.765 | 0.000 | 167.765 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 8106: *Command Support Equipment* | 2.755 | 5.883 | 3.372 | - | 3.372 | 4.481 | 6.335 | 5.755 | 5.871 | 0.000 | 47.685 |
| • 0604703N / PU 1822: *Personnel Training, Sim & Human Factors* | 24.229 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 24.229 |

**Remarks**

BLI 8106 for NP2 and ADE.
Research and Development Funds for MPT&E Transformation under PE 0604703N have been consolidated within PE 0605013N PU 2905 starting in FY19.

**D. Acquisition Strategy**

As a general rule IT development programs use an agile software development methodology therefore milestones, tasks and phases are often conducted in parallel vice sequentially.

BILLET BASED DISTRIBUTION (BBD)
Beginning in FY20, distribution requirement falling under auspices of NP2 as part of the MPT&E transformation.

LEARNING STACK (Formerly LEARNING MANAGEMENT SYSTEM - DISTANCE LEARNING)
Use existing GWAC or competitive contract for any new product sourcing, use existing Bi-Service PeopleSoft license, Indefinite Delivery/Indefinite Quantity contract vehicles within PMW 240 for additional design and integration services. Investigate option of using an Interagency Agreement for an Assisted Acquisition with the Office of Personnel Management's USA Learning program.

NAVY PERSONNEL AND PAY SYSTEM (NP2)

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

NP2 will incrementally implement Navy's personnel and pay modernization strategy using a variety of IDIQ contract task orders. These task orders will use commercial off the shelf (COTS) software (PeopleSoft Global Payroll and PeopleSoft General Ledger) to extend the Navy Personnel and Pay (NP2) functionality based on PeopleSoft Human Capital Management.

SINGLE POINT OF ENTRY (SPOE)
The required services will be procured through a competitive small business Indefinite Delivery / Indefinite Quantity (ID/IQ) Cost Plus Fixed Fee (CPFF) 8a contract.

NAVY MANPOWER REQUIREMENTS SYSTEM (NMRS)
Beginning in FY20, requirements for this system will fall under auspices of NP2 as part of the MPT&E transformation.

RISK MANAGEMENT INFORMATION (RMI)
There are existing Commercial-Off-the-Shelf (COTS) software and services that, with customization, can fill the Navy's documentation requirements and generate safety reporting of the United States Naval forces. These services will be procured through an 8A CPFF contract.

The Navy plans to leverage Contractor developed safety-related products by using a modular contracting approach to implement and combine capabilities from the following systems.

(a) Streamlined Incident Reporting (SIR)
(b) Single Point of Entry (SPOE)
(c) Safety Program Management (SPM);
(d) Analysis & Dissemination (A&D)

AUTHORITATIVE DATA ENVIRONMENT (ADE)
The required services will be procured through multiple Cost Plus Fixed Fee (CPFF) task orders awarded on a competitive, multiple award, small business Indefinite Delivery / Indefinite Quantity (ID/IQ) contract for PMW 240 enterprise services, and also on a competitive, single award, large business Indefinite Delivery / Indefinite Quantity (ID/IQ) contract for tasking related to personnel and pay modernization.

APPLICANT RELATIONSHIP MANAGEMENT (ARM)
Beginning in FY20, requirements for this system will fall under auspices of NP2 as part of the MPT&E transformation.

**E. Performance Metrics**

LEARNING STACK (LS)
Capturing end user screen refresh latency as compared to current system benchmarks for on-line courses.
Identifying all integration points, failure modes and data flows required for the additional technology and approach
Identifying supply chain, instructional, and student management business process changes needed to employ the technology

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

Assessing server utilization and physical architecture projections (#s and types of hardware/SW/network appliances) needed for full scale use of the technology.

NAVY PERSONNEL AND PAY SYSTEM (NP2)
The system shall allow role-based access to SSN and/or masked SSN in accordance with Personally Identifiable Information (PII) instructions 100% of the time.
The system shall have a retrieval or generation of data entry/navigation screen within 4 seconds for 90% of transactions.
System maintainability - Failures or unplanned outages shall be restored within 4 hours.
The system shall have sufficient capacity to handle anticipated user demand based on increased functionality and accessibility for at least 12,000 simultaneous users.
Data consistency - The system shall produce consistent reports when a query is duplicated using identical user-selected parameters, to include the specific timestamp of the query. System will be within 99% accuracy in replicating the report content.
Data accuracy - The system shall generate forms and accurately populate them with authoritative source data with greater than 99% accuracy between the data auto-populated forms and the data contained within the system.

SINGLE POINT OF ENTRY (SPOE)
MNP will meet acquisition program and system engineering and technical review milestones for development with no outstanding severity 1-3 defects prior to production release. The portal will manage at least 50,000 concurrent actions per hour and 200,000 concurrent users per hour.

RISK MANAGEMENT INFORMATION (RMI)
Safety Incident Reporting Functionality - The system shall provide the ability to utilize RMI mishap, near mishap, and hazard initial notification, report drafting, report submission, report endorsement, and mishap recommendation / action item response and tracking functionality for at least 95% of Navy and Marine Corps operational ground forces, shore commands, surface forces, aviation forces, and submarine forces
Incident Data Capture - The system shall capture safety incident report data 100% of the time.
Security - The system shall protect flagged Safety Privilege, Personally Identifiable Information (PII), and Protected Health Information (PHI), and allow only role-based access in accordance with law, regulation and policy (LRP) instructions. 100% of flagged Safety Privilege, PII, and PHI data shall be protected from unauthorized roles and tacit export.
Registered Users - The system shall support user account access for Navy and Marine Corps members and safety support users for all safety user types = (administrative, power, occasional, and infrequent)
Concurrent Active Users - The system shall have sufficient capacity to support concurrent active users or greater than 20% of all safety users.
Response Time - Data requests/queries, reports, building of custom views, etc. shall not significantly impact transaction processing time. All items will be processed within 1 second or less for 90% of requests and 3 seconds or less for 10% of single record requests.

AUTHORITATIVE DATA ENVIRONMENT (ADE)
The system shall provide an audit trail for all system transactions.
The system shall transfer data payloads of up to 1 megabyte (MB) among services.
The system shall transfer data transactions of up to 1 MB among applications.
The system shall allow any authorized application or system to insert data.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

The system shall provide CAC-enabled login for identity management.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>2905 / *BUPERS IT* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BBD Phase 1c Increment 1 and 2, Phasde 2 | C/CPFF | SSC, INC : New Orleans, LA | 11.685 | 0.400 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| LMS-DL Pilot and Career Profile Management | C/CPFF | OPM : Pensacola, FL | 3.801 | 0.000 | | 6.469 | May 2019 | 4.851 | May 2020 | - | | 4.851 | Continuing | Continuing | Continuing |
| MNP/SPOE | C/CPFF | Katmai : Arlington, VA | 13.424 | 13.063 | Jul 2018 | 11.145 | May 2019 | 39.477 | May 2020 | - | | 39.477 | Continuing | Continuing | Continuing |
| TFMMS Design, Development, Test & Deployment (2 Increments) | C/CPFF | A3IS : Palm Coast, FL | 6.619 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.619 | Continuing |
| PRIDE MOD II Design, Development, Test & Deployment | C/CPFF | CGI, Fed : Washington, DC | 2.185 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.185 | 1.370 |
| AOA Design, Development, Test & Deployment | C/CPFF | GDIT : New Orleans, LA | 1.792 | 0.000 | | 0.500 | Mar 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| NP2 Rapid Prototype Pilot | C/CPFF | GDIT/Na Ali : Washington, DC | 0.000 | 0.000 | | 32.350 | Oct 2018 | 46.243 | Oct 2019 | - | | 46.243 | Continuing | Continuing | Continuing |
| NMRS Design, Development, Test & Deployment | C/CPFF | Millienium : New Orleans, LA | 0.262 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| RMI SIR/SPOE/SPM/A&D Design, Development, Test & Deployment | C/CPFF | Syneren : Arlington, VA | 8.651 | 1.058 | Jul 2018 | 1.100 | Jun 2019 | 7.000 | Jun 2020 | - | | 7.000 | Continuing | Continuing | Continuing |
| ADE - BI / Visualization / Analytics Products | C/CPFF | GDIT : Washington, D.C. | 3.500 | 0.000 | | 5.600 | May 2019 | 3.000 | May 2020 | - | | 3.000 | Continuing | Continuing | Continuing |
| ADE - System Integration | C/CPFF | Millenium : Washington, D.C. | 1.200 | 0.000 | | 4.400 | Apr 2019 | 2.200 | Apr 2020 | - | | 2.200 | Continuing | Continuing | Continuing |
| ARM Phase 1-3 Design, Development, Test & Deployment | C/CPFF | HP : Orlando, FL | 2.700 | 0.537 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.237 | 2.221 |
| NP2 Rapid Fielding Pilot | C/CPFF | GDIT/ Na Ali : Honolulu, HI | 0.000 | 0.000 | | 0.000 | | 51.805 | Oct 2019 | - | | 51.805 | 0.000 | 51.805 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NP2 Transformation | C/CPFF | GDIT/Na Ali : Washington, DC | 13.736 | 6.248 | Jan 2018 | 23.937 | Jan 2019 | 13.189 | Jan 2020 | - | | 13.189 | 0.000 | 57.110 | - |
| | | **Subtotal** | 69.555 | 21.306 | | 85.501 | | 167.765 | | - | | 167.765 | Continuing | Continuing | N/A |

**Remarks**

NP2 - The Navy intends to transform labor intensive, antiquated paper-based processes into standardized, automated processes that support audit readiness, improve customer service, and require less complex management oversight. NP2 will develop and deploy modernizations, enhancements, and integration of products towards an objective capability focused on Navy personnel process standardization, authoritative data, and a central personnel and pay service delivery model to achieve CNP's transformation goal.

In FY20, the funding increase is due to the overlap of two large scale pilots for NP2 (RPP & RFP). Rapid Pilot Prototype (RPP) funding will support the remainder of Developmental Testing (including Vendor support), Training and Deployment efforts, and Operational/ Parallel Testing with select populations in the fleet. Simultaneously, the Rapid Fielding Pilot (RFP) will be occurring for the full FY20 in an Agile methodology covering Requirements gathering, Development, Testing, and support for Deployment by Jan 2021.
1. RPP will use a rapid prototype approach to deliver pilot for PeopleSoft pay capability; build and demonstrate in production-like environment; delivery of "field-able" capability in the Government Cloud Environment. Maximize use of PeopleSoft 9.2 Human Capital Management (HCM) out of the box and leverage Field Test 1 build. Support Treasury Direct Disbursing (TDD) capabilities including testing and validation of a bi-directional interface with Treasury. Generate pay file to Global Exchange (GEX). Integration testing for RPP.
2. RFP will design, build and test sprint cycle for residual Pay & Personnel capability. In addition to build out interfaces and data exchanges needed for fielding; Operational Testing and parallel operations, as well as training activities.

SPOE - Increase of $28.3M. The increase in funding of $28.3M from FY19 ($11.1M to $39.5M) to FY20 can directly be attributed to the increase in scope and scale in which the Single Point of Entry (SPOE) program line is executing against. Increased efforts are directly attributed to:
1. New challenges within technical development including transactional mobile applications
2. Development and production of commercial cloud based Identity and Access Management (IdAM) services
3. More robust level-of-effort requirement for cybersecurity
4. System and services integration - integration with My Navy Career Center, CRM solution, IdAM, Mobile Apps, and legacy systems

RMI - Increase of $5.9M. Funding increase from FY19 to FY20 associated with the following requirements:
1. Analysis and Dissemination Development, Modernization, and Integration. Funding to execute A/D mission of providing actionable information to reduce safety incidents. Without the support of more sophisticated analytics to include predictive analytics, Navy will not be able to employ more predictive capabilities to improve safety across the DON in alignment with the SECNAV Strategic Readiness Review.
2. Safety Program Management Development and Modernization - Develop and Deploy Safety Program Management functionality. RMI is developing an SPM capability that replaces legacy systems and modernizes interface and capabilities. Both initiatives consolidate safety systems, makes it easier to report mishaps, and provides authoritative data to help improve safety conditions.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

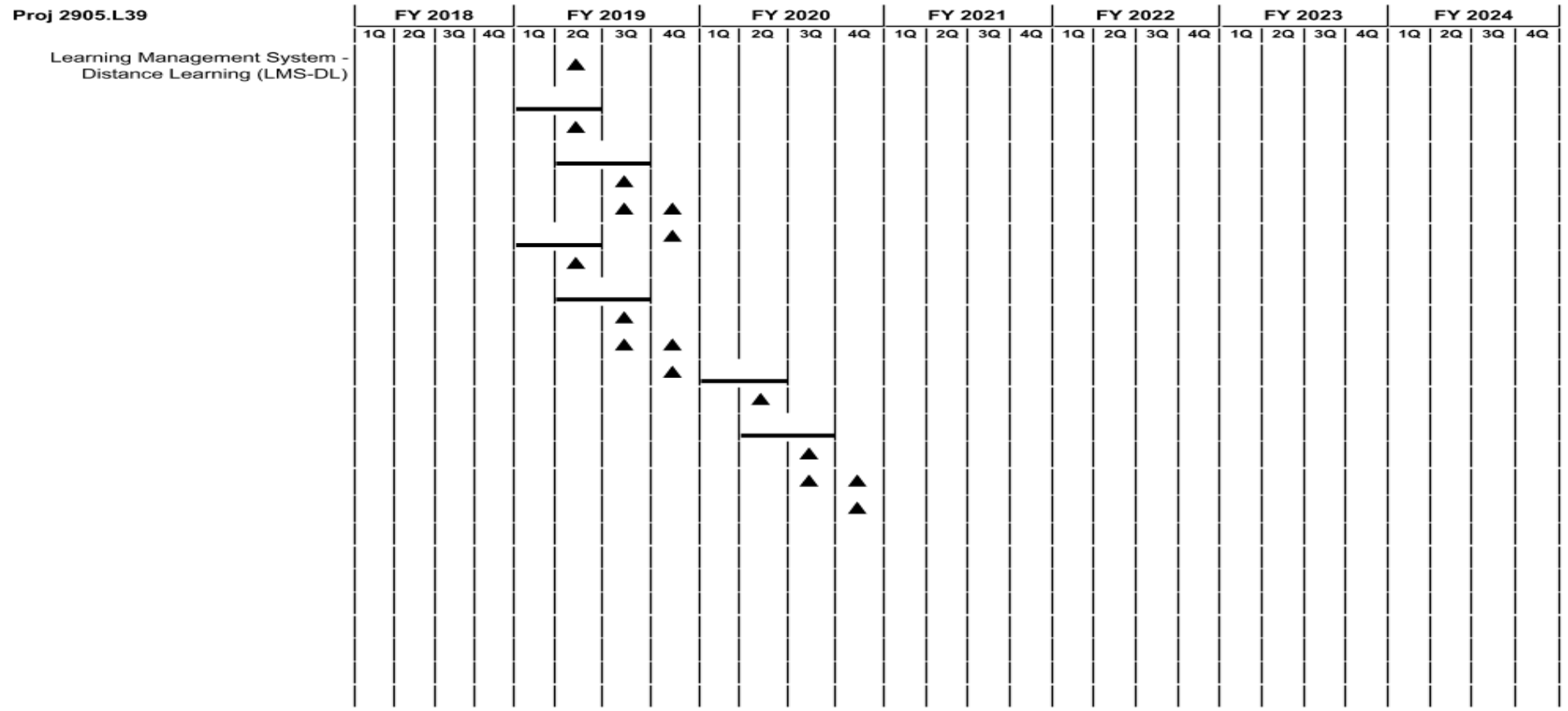
**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NSIPS Bi-Service License | C/CPFF | Oracle : Redwood City, CA | 13.206 | 3.689 | Dec 2017 | 3.805 | Dec 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 13.206 | 3.689 | | 3.805 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 82.761 | 24.995 | | 89.306 | | 167.765 | | - | | 167.765 | Continuing | Continuing | N/A |

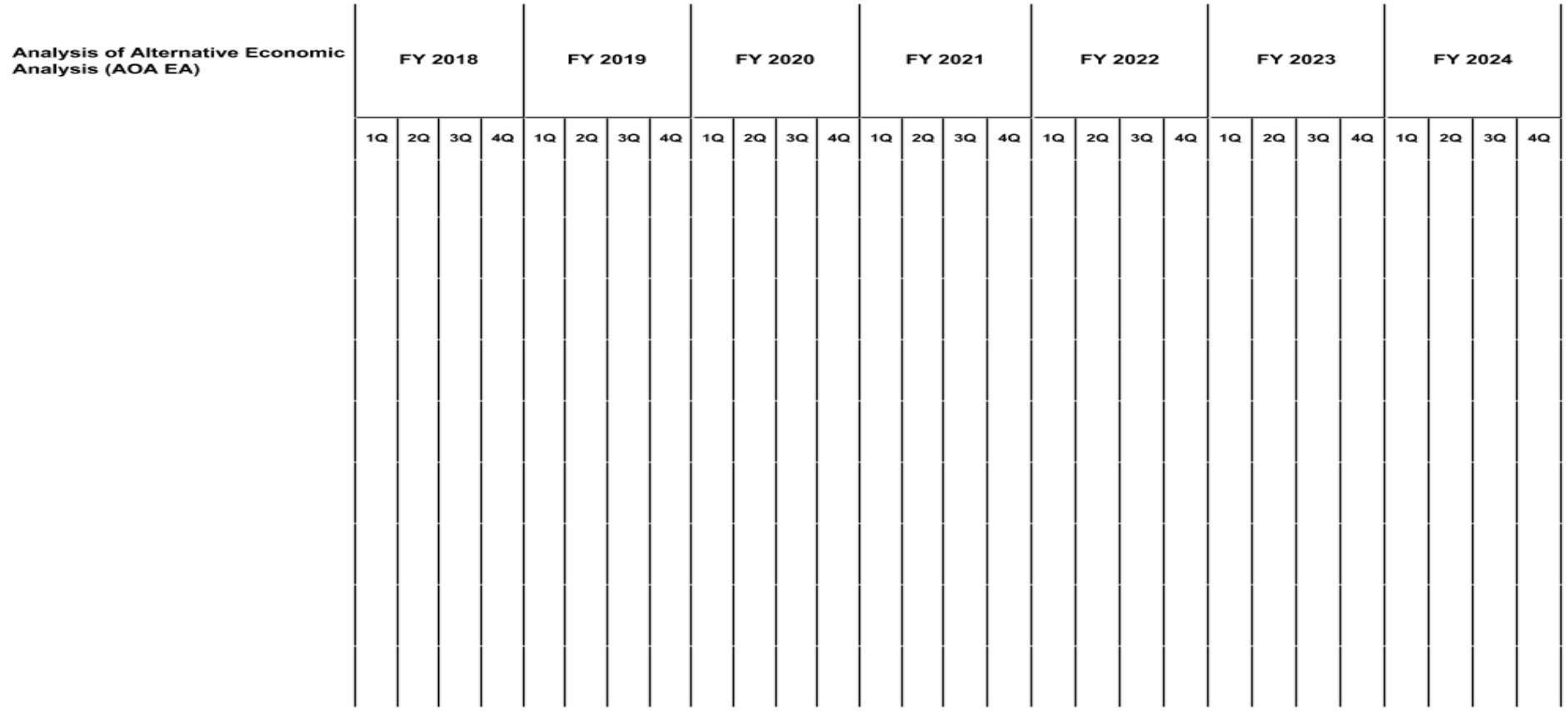
**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |



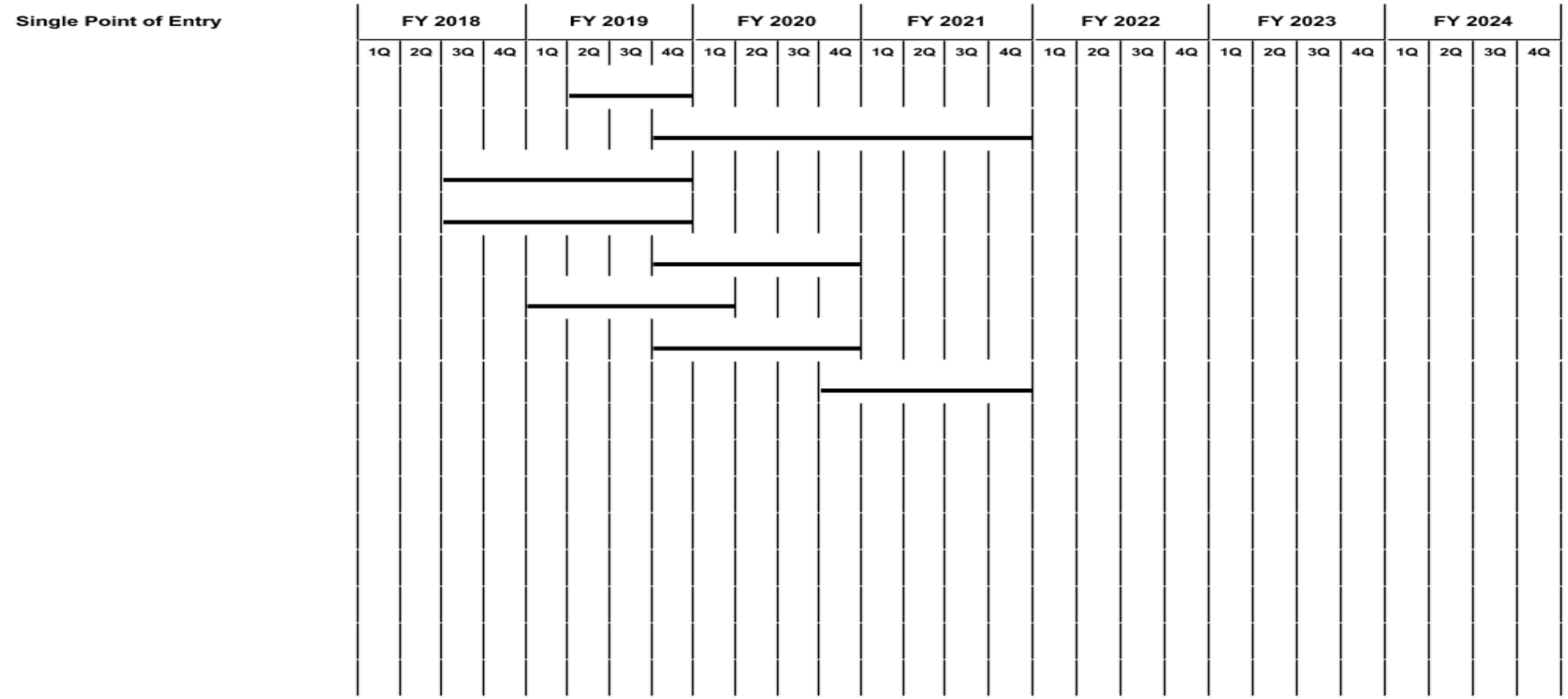

*2020PB - 0605013N - 2905.L39*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |



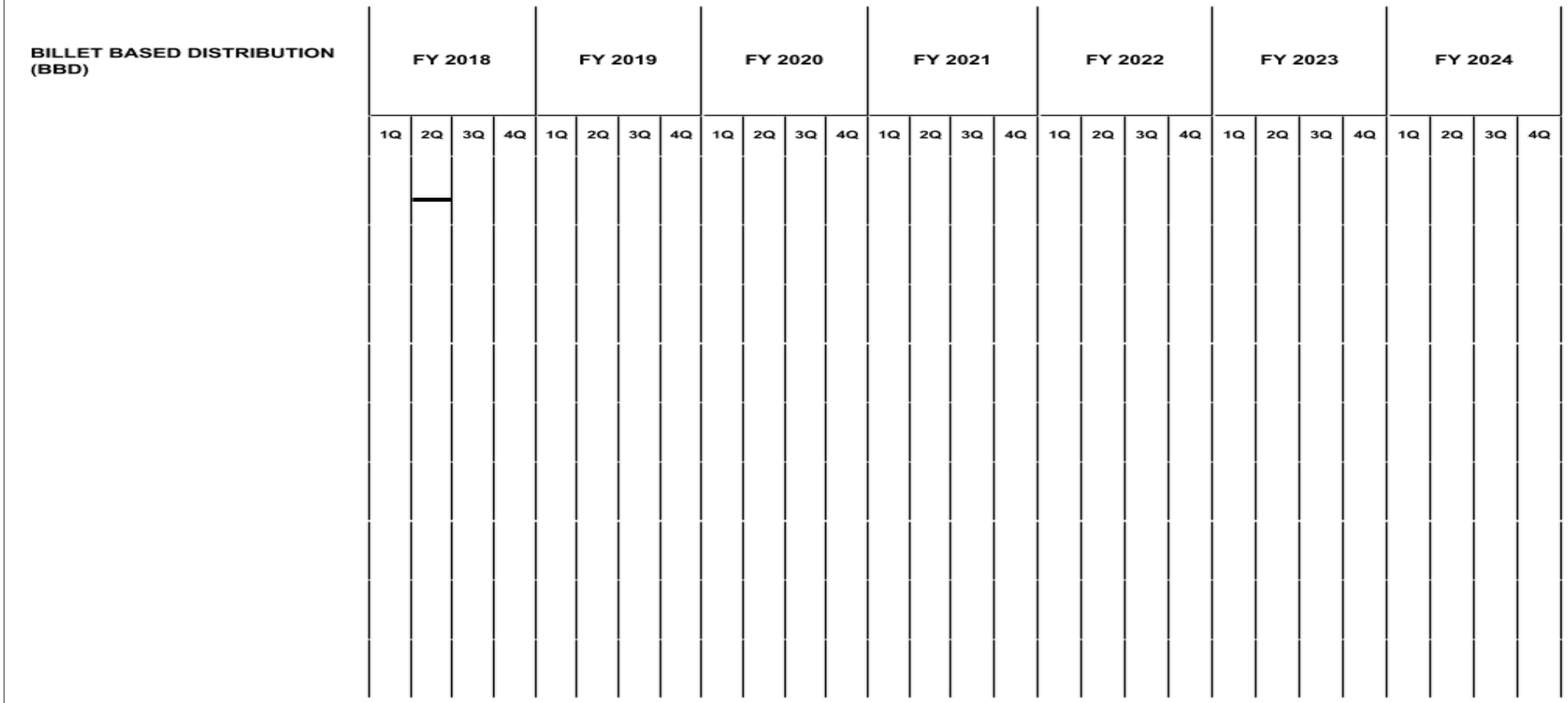

*2020PB - 0605013N - 2905.L39*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |



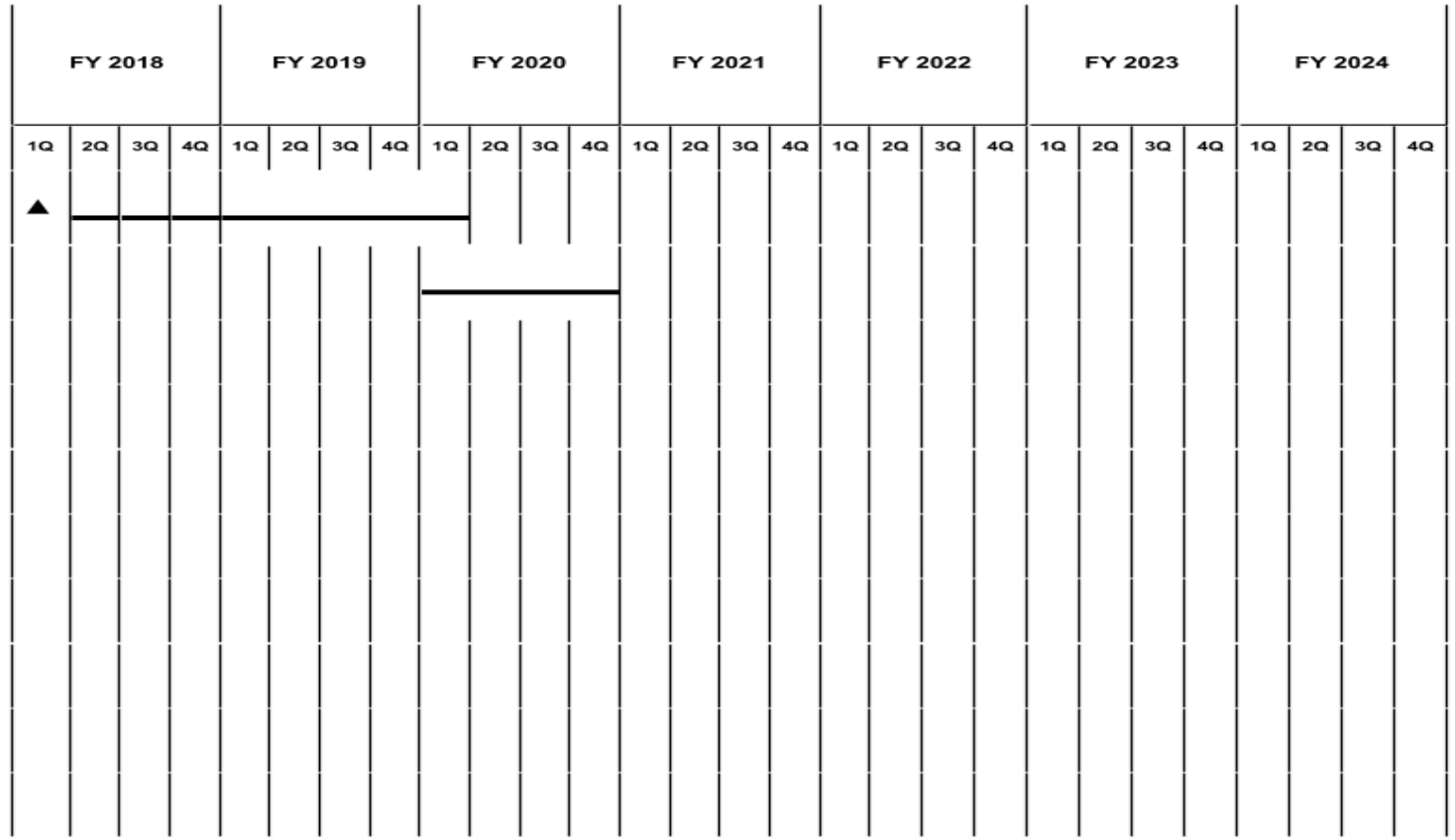

*2020PB - 0605013N - 2905.L39*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |




*2020PB - 0605013N - 2905.L39*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |




*2020PB - 0605013N - 2905.L39*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2905.L39*** | | | | |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Pilot Tech Assessment Report | 2 | 2019 | 2 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Design | 1 | 2019 | 2 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Preliminary Design Review | 2 | 2019 | 2 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Development | 2 | 2019 | 3 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Critical Design Review | 3 | 2019 | 3 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Testing | 3 | 2019 | 3 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Production Readiness Review | 4 | 2019 | 4 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Career Profile Management Deployment | 4 | 2019 | 4 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Design | 1 | 2019 | 2 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Preliminary Design Review | 2 | 2019 | 2 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Development | 2 | 2019 | 3 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Critical Design Review | 3 | 2019 | 3 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Testing | 3 | 2019 | 3 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Production Readiness Review | 4 | 2019 | 4 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Decentralized Learning Delivery & Management Deployment | 4 | 2019 | 4 | 2019 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Design | 1 | 2020 | 2 | 2020 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Preliminary Design Review | 2 | 2020 | 2 | 2020 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Development | 2 | 2020 | 3 | 2020 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Critical Design Review | 3 | 2020 | 3 | 2020 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Testing | 3 | 2020 | 3 | 2020 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Production Readiness Review | 4 | 2020 | 4 | 2020 |
| Learning Management System - Distance Learning (LMS-DL): LMS-DL Advancement Changes Deployment | 4 | 2020 | 4 | 2020 |
| ***Analysis of Alternative Economic Analysis (AOA EA)*** | | | | |
| AoA Risk Reduction Field Test Study - PersPay | 1 | 2019 | 4 | 2019 |
| ***Single Point of Entry*** | | | | |
| MNP Phase 2C Acceptance Testing | 2 | 2019 | 4 | 2019 |
| MNP Phase 2C Production | 4 | 2019 | 4 | 2021 |
| MNP Phase 2C Final Development | 3 | 2018 | 4 | 2019 |
| MNP Develop & Integrate Additional CLE Portlets | 3 | 2018 | 4 | 2019 |
| MNP: MNCC Sailor Self-Service Integration | 1 | 2019 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| MNP: Establish IdAM Solution | 4 | 2018 | 2 | 2020 |
| MNP: SPOE Integration with ADE | 4 | 2018 | 4 | 2020 |
| MNP: Infrastructure Upgrades and Expansion | 4 | 2019 | 4 | 2020 |
| MNP: SPOE Training Support Content and Page Administrators | 1 | 2018 | 3 | 2020 |
| MNP Planning for SPOE Migration to Commercial Cloud Hosting Solution | 1 | 2019 | 1 | 2020 |
| MNP Develop, Test & Release Portlets | 4 | 2019 | 4 | 2020 |
| MNP Develop, Test & Release Additional Portlets | 4 | 2020 | 4 | 2021 |
| Mobile Applications: My Record native mobile application development | 2 | 2018 | 4 | 2021 |
| Mobile Applications: Integration with IdAM services for MR mobile application | 3 | 2018 | 3 | 2020 |
| Mobile Applications: Integration with ADE services for data delivery to MR mobile application | 3 | 2018 | 3 | 2020 |
| Mobile Applications: Development of the uniform mobile application | 2 | 2018 | 3 | 2021 |
| Identity and Access Management: Execution of a Full Scale IdAM pilot | 2 | 2018 | 2 | 2019 |
| Identity and Access Management: Development and testing of an IdAM solution | 2 | 2019 | 1 | 2021 |
| Identity and Access Management: End user, cycber security, and technical testing of the IdAM solution | 1 | 2019 | 1 | 2020 |
| Identity and Access Management: Integration of the IdAM solution with the MR mobile application | 2 | 2019 | 2 | 2020 |
| Identity and Access Management: Integration of the IdAM solution with additional mobile and web applications | 1 | 2020 | 4 | 2020 |
| Identity and Access Management: Integration of the IdAM solution to obtain, authorize, and control multiple persons | 4 | 2020 | 3 | 2021 |
| ***BILLET BASED DISTRIBUTION (BBD)*** | | | | |
| BBD Phase 1c Increment 1 Production Readiness Review/Production Rollout | 2 | 2018 | 2 | 2018 |
| ***NAVY PERSONNEL AND PAY (NP2)*** | | | | |
| NP2 PERS MOD Critical Design Review | 2 | 2018 | 2 | 2018 |
| NP2 PERS MOD Application Test Readiness Review | 3 | 2018 | 3 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| NP2 PERS MOD PRR | 4 | 2018 | 4 | 2018 |
| NP2 PeopleSoft License Renewal FY18 | 1 | 2018 | 1 | 2018 |
| NP2: Testing for the NP2 Rapid Prototype Pilot | 1 | 2019 | 1 | 2020 |
| NP2: Compile to Combat Activities for NP2 | 4 | 2018 | 1 | 2020 |
| NP2: Capability Drop for NP2 RPP | 1 | 2020 | 1 | 2020 |
| NP2: Rapid Fielding Pilot# 1 | 1 | 2020 | 2 | 2021 |
| NP2: Transition of NP2 to commercial cloud environment | 1 | 2020 | 4 | 2020 |
| NP2: Complete DJMS data celeaning | 2 | 2020 | 4 | 2020 |
| NP2: Deployment Planning for NP2 RFP # 1 | 4 | 2020 | 1 | 2021 |
| NP2 Risk Reduction Field Test Study - PersPay | 1 | 2020 | 4 | 2020 |
| NP2: Conduct design and development sprints for NP2 RFP # 1 | 1 | 2020 | 4 | 2020 |
| NP2: Conduct SE events for NP2 RFP # 1 | 2 | 2020 | 1 | 2021 |
| PAY MOD Increment 1 Preliminary Design Review | 2 | 2018 | 2 | 2018 |
| NP2: Planning activities for NP2 RFP # 2 | 4 | 2020 | 1 | 2021 |
| NP2: Training activities for RFP # 1 | 4 | 2020 | 1 | 2021 |
| NP2: Interoperability and Operational Testing for RFP # 1 | 2 | 2021 | 2 | 2021 |
| NP2: Deployment of RFP # 1 | 1 | 2021 | 2 | 2021 |
| NP2: Deployment Planning for NP2 RFP # 2 | 2 | 2021 | 3 | 2021 |
| NP2: Training activities for RFP # 2 | 3 | 2021 | 4 | 2021 |
| NP2: Planning activities for NP2 RFP # 3 | 4 | 2021 | 1 | 2022 |
| PAY MOD Increment 1 Development | 2 | 2018 | 3 | 2019 |
| NP2: Conduct design and development sprints for NP2 RFP # 2 | 4 | 2021 | 3 | 2022 |
| NP2: Conduct SE events for NP2 RFP # 2 | 1 | 2022 | 4 | 2022 |
| PAY MOD Continue Execution of Field Test 2 Sprint X | 4 | 2018 | 2 | 2020 |
| PAY MOD Incremental deployment of Field Test 2 Functionality into NP2 baseline | 3 | 2019 | 4 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| PAY MOD Deployment to IPPS-N baseline | 2 | 2020 | 2 | 2020 |
| PAY MOD Pers Driving Pay capability removed from NP2 baseline | 2 | 2020 | 2 | 2020 |
| PAY MOD Capability Set 2 deployed to NP2b aseline | 2 | 2021 | 2 | 2021 |
| PAY MOD Capability Set 2 removed from NP2 baseline | 2 | 2021 | 2 | 2021 |
| PAY MOD Capability Set 3 deployed to NP2 baseline | 2 | 2022 | 2 | 2022 |
| PAY MOD Capability Set 3 removed from NP2 baseline | 2 | 2022 | 2 | 2022 |
| PAY MOD 55 to X functionality set 1 deployed to NP2 baseline | 4 | 2020 | 4 | 2020 |
| PAY MOD 55 to X functionality set 2 deployed to NP2 baseline | 4 | 2021 | 4 | 2021 |
| PAY MOD 55 to X functionality set 3 deployed to NP2 baseline | 4 | 2022 | 4 | 2022 |
| AC/RC PERMEABILITY SOLUTION - Task Order Award | 1 | 2018 | 1 | 2018 |
| PH1 AC/RC PERMEABILITY SOLUTION - Systems Requirements Review | 2 | 2018 | 2 | 2018 |
| PH1 AC/RC PERMEABILITY SOLUTION - Design | 2 | 2018 | 3 | 2018 |
| PH1 AC/RC PERMEABILITY SOLUTION - Preliminary Design Review | 3 | 2018 | 3 | 2018 |
| PH1 AC/RC PERMEABILITY SOLUTION - Critical Design Review Iteration One | 1 | 2019 | 1 | 2019 |
| PH1 AC/RC PERMEABILITY SOLUTION - Application Test Readiness Review Phase One | 2 | 2019 | 2 | 2019 |
| PH1 AC/RC PERMEABILITY SOLUTION - Application Functional Testing /System Int. Testing | 2 | 2019 | 2 | 2019 |
| PH1 AC/RC PERMEABILITY SOLUTION - Full Deployment Phase | 3 | 2019 | 3 | 2019 |
| PH2 AC/RC PERMEABILITY SOLUTION - Critical Design Review Phase Two | 3 | 2019 | 3 | 2019 |
| PH2 AC/RC PERMEABILITY SOLUTION - Application Test Readiness Review Phase Two | 4 | 2019 | 4 | 2019 |
| PH2 AC/RC PERMEABILITY SOLUTION - Application Functional Testing /System Int. Testing Nov 19 | 1 | 2020 | 1 | 2020 |
| PH2 AC/RC PERMEABILITY SOLUTION - Full Deployment Phase Two Jan 20 | 2 | 2020 | 2 | 2020 |
| PH3 AC/RC PERMEABILITY SOLUTION - Critical Design Review Phase Three April 20 | 3 | 2020 | 3 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| PH3 AC/RC PERMEABILITY SOLUTION - Application Test Readiness Review Phase Three Jul 20 | 4 | 2020 | 4 | 2020 |
| PH3 AC/RC PERMEABILITY SOLUTION - Application Functional Testing /System Int. Testing Sep 20 | 4 | 2020 | 4 | 2020 |
| PH3 AC/RC PERMEABILITY SOLUTION - Full Deployment Phase Three Nov 20 | 1 | 2021 | 1 | 2021 |
| PH4 AC/RC PERMEABILITY SOLUTION - Critical Design Review Phase Four Jan 21 | 2 | 2021 | 2 | 2021 |
| PH4 AC/RC PERMEABILITY SOLUTION - Application Test Readiness Review Phase Four Apr 21 | 3 | 2021 | 3 | 2021 |
| PH4 AC/RC PERMEABILITY SOLUTION - Application Functional Testing /System Int. Testing Jul 21 | 4 | 2021 | 4 | 2021 |
| PH4 AC/RC PERMEABILITY SOLUTION - Full Deployment Phase Three Sept 21 | 4 | 2021 | 4 | 2021 |
| ***Risk Management Information (RMI)*** | | | | |
| RMI Safety Program Management Acceptance Test Readiness Review | 2 | 2018 | 2 | 2018 |
| RMI Safety Program Management Test Readiness Review | 4 | 2018 | 4 | 2018 |
| RMI Safety Program Management Post Implementation Review | 3 | 2018 | 3 | 2019 |
| RMI Safety Program Management Full Deployment | 3 | 2019 | 4 | 2021 |
| RMI Analysis and Dissemination Phase II Acceptance Test Readiness Review | 1 | 2018 | 1 | 2018 |
| RMI Analysis and Dissemination Phase II Test Readiness Review | 3 | 2018 | 3 | 2018 |
| RMI Analysis and Dissemination Phase II Acceptance Post Implementation Review | 4 | 2018 | 4 | 2018 |
| RMI Analysis and Dissemination Phase II Full Deployment | 4 | 2018 | 2 | 2019 |
| RMI Analysis and Dissemintation Phase 3 - Predictive Analytics | 2 | 2019 | 1 | 2021 |
| RMI Streamlined Incident Reporting 2.0 | 2 | 2018 | 2 | 2019 |
| RMI Streamlined Incident Reporting 3.0 | 2 | 2019 | 2 | 2020 |
| ***Authoritative Data Environment (ADE)*** | | | | |
| ADE Phase 2 Enterprise ADE Baseline SRR/SFR | 2 | 2018 | 2 | 2018 |
| ADE Phase 2 Enterprise ADE Baseline PDR | 2 | 2018 | 2 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>2905 / *BUPERS IT* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ADE Phase 2 Enterprise ADE Baseline CDR | 2 | 2018 | 3 | 2018 |
| ADE Phase 2 Enterprise ADE Baseline PRR | 3 | 2018 | 3 | 2018 |
| ADE Phase 2 Enterprise ADE Baseline IOC | 3 | 2018 | 3 | 2018 |
| ADE Phase 3 Enterprise ADE Functional Laboratory Build | 1 | 2019 | 3 | 2019 |
| ADE Phase 3 Enterprise ADE Infrastructure in Cloud Build | 1 | 2019 | 3 | 2019 |
| ADE Phase 4 NTMPS consolidation to ADE migration to cloud | 1 | 2019 | 2 | 2019 |
| ADE Phase 4 NPDB consolidation to ADE in cloud | 1 | 2019 | 2 | 2021 |
| ADE Phase 4 NMPBS consolidation to ADE in cloud | 3 | 2019 | 4 | 2021 |
| ADE Phase 4 NTMPS ADE 1.5 BBD Ad Hoc Caapbility into ADE in cloud | 1 | 2018 | 1 | 2024 |
| ADE Phase 4 NPDB Finalized consolidation to ADE in cloud | 1 | 2018 | 1 | 2024 |
| ADE Phase 4 Enable FLTMPS capability into ADE in cloud | 1 | 2018 | 1 | 2024 |
| ADE Phase 4 NRDW consolidation to ADE in cloud | 1 | 2020 | 2 | 2020 |
| ADE Phase 4 C-WAY consolidation to ADE in cloud | 3 | 2020 | 4 | 2020 |
| ADE Phase 4 PRIDE-MOD consolidation to ADE in cloud | 3 | 2020 | 4 | 2020 |
| ADE Phase 4 CeTARS consolidation to ADE in cloud | 1 | 2021 | 2 | 2021 |
| ADE Phase 4 NSIPS Analytics consolidation to ADE in cloud | 3 | 2021 | 4 | 2021 |
| ADE Phase 4 NSIPS Analytics consolidation to ADE in cloud (FOC) | 1 | 2022 | 2 | 2022 |
| ***Applicant Relationship Management (ARM)*** | | | | |
| ARM Phase 2 Incremental Test # 2 | 1 | 2018 | 1 | 2018 |
| ARM Phase 2 Code Release # 2 | 1 | 2018 | 1 | 2018 |
| ARM Phase 2 Development # 3 | 1 | 2018 | 3 | 2018 |
| ARM Phase 2 Critical Design Review | 1 | 2018 | 1 | 2018 |
| ARM Phase 2 Incremental Test # 3 | 3 | 2018 | 3 | 2018 |
| ARM Phase 2 Code Release # 3 | 3 | 2018 | 3 | 2018 |
| ARM Phase 2 Development # 4 | 3 | 2018 | 3 | 2019 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3167 / *Joint Technical Data Integration (JTDI)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3167: *Joint Technical Data Integration (JTDI)* | 35.093 | 2.462 | 3.883 | 5.545 | - | 5.545 | 8.178 | 6.233 | 7.211 | 7.989 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Joint Technical Data Integration (JTDI) Program - JTDI funding supports the evaluation, testing and integration to develop a JTDI Government Off-The-Shelf (GOTS) solution for installation on Carrier and Amphibious Assault class ships and at other globally deployed Navy/Marine Corp aviation activities. JTDI is a digital technical data access, delivery and local Organizational & Intermediate level library management toolset. It improves accuracy and timeliness of technical manual and other technical data delivery and minimizes the Fleet's library management burden. JTDI reduces maintenance work hours with a savings Return on Investment of 2.5:1. JTDI also provides deployed maintenance personnel with 24x7 collaborative reach-back/tele-maintenance capabilities so that Fleet Support Teams/Engineering Technical Services can remotely diagnose problems and assist with repairs, and provides for process efficiencies to support ongoing Aviation Fleet Technical Representative reductions.

Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) - MAL-EIT funding supports the evaluation, development, testing and integration of software and hardware solutions across all US Marine Corps Aviation activities to be used in the planning and execution of geographically distributed, expeditionary Aviation Logistics (AVLOG) chains in support of deployed USMC Air Combat Element operations. The MAL-EIT Program is one of four programs contained within the Marine Aviation Logistics Support Program (MALSP) modernization program known as MALSP II. Legacy MALSP is nearly 25 years old and grossly inadequate in IT capability to meet the informational, planning, and C2 needs of a dynamic, geographically distributed nodal AVLOG system. MAL-EIT is a Defense Business System Abbreviated Acquisition Program that will develop and deliver the required IT capability necessary to eliminate the IT related gaps existing in the legacy MALSP. MAL-EIT is a family of IT solutions to be developed and delivered in three increments. These increments are depicted below:

Expeditionary Pack Up Kit (EPUK): Provides Expeditionary Supply Operations to include business administration, inventory, and customer service operations.

Next Generation Buffer Management System: Provides buffer management in a time domain, and buffer sizing analysis.

Logistics Planning Tool and Optimizer Tool: Provides capability to develop tailored Remote Expeditionary Support Packages, consumption forecasts, and Nodal Logistics Lay down designs.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint Technical Data Integration (JTDI) | 0.924 | 1.413 | 4.945 | 0.000 | 4.945 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Conduct development and redeployment efforts associated with a major release of fully deployed GOTS intensive JTDI system Version 2.0.6.5. Conduct COTS requirements definition, evaluation, integration, and testing of annual baseline releases. Perform development and testing in support of integration and consolidation of the Next Generation - Technical Manual Management Program (NG-TMMP) with the JTDI Program.<br>***FY 2020 Base Plans:***<br>Conduct development, modernization, obsolescence management, and cybersecurity mandated activities associated with a major release of fully deployed COTS-intensive JTDI system Version 2.0.6.5. Conduct COTS requirements definition, evaluation, integration, and testing of annual baseline releases. Perform development and testing in support of integration with authoritative sources of technical data and enterprise business systems. Continued development of Global Data Repository (GDR), a common repository for Condition Based Maintenance Plus (CBM+) raw data files collected by smart aircraft diagnostic, prognostic, health and usage monitoring systems. GDR provides an enterprise solution to eliminate the need for weapon system programs to develop and maintain redundant, platform-unique IT solutions.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $3.532M increase from FY 2019 to FY 2020 will modernize and scale the standard data repository (SDR) and enterprise analytics infrastructure for CBM+ data to integrate additional weapon system platforms and provide core analytics at the edge. Funding will also support the integration with Agile Core Services (ACS) to achieve greater interoperability with other applications; control future fielding and sustainment costs; and enable rapid development, integration, and deployment of future system releases. As well as incorporate automated configuration control and improved inventory management of globally deployed technical data and IT assets. | | | | | |
| ***Title:*** Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) | 1.538 | 2.470 | 0.600 | 0.000 | 0.600 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Complete fielding of Logistics Planning Tool/MAL-EIT 3.0 solution and begin software development of MAL-EIT 3.1.<br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Complete software development of MAL-EIT 3.1 and begin test and evaluation and limited fielding of MAL-EIT 3.1 solution<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $1.87M decrease from FY 2019 to FY 2020 is due to the completion of software development of MAL-EIT 3.1 and limited fielding of MAL-EIT 3.1 solution. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.462 | 3.883 | 5.545 | 0.000 | 5.545 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4268/JTDI: *Joint Technical Data Integration (JTDI) Other Aviation Support Equipment* | 0.752 | 2.340 | 2.365 | - | 2.365 | 2.408 | 2.453 | 2.502 | 2.552 | Continuing | Continuing |
| • OPN/4268/MALSP II: *Marine Aviation Logistics Support Program (MALSP II) Aviation Support* | 0.200 | 0.219 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Joint Technical Data Integration (JTDI) Program - The management approach includes the Program Management Office residing in NAVAIR with Milestone Decision Authority delegated to the NAVAIR 6.0, Assistant Commander for Logistics and Industrial Operations . The evolutionary development approach will be used to execute requirements. Contracting for the prime integrator will be via competitively awarded indefinite delivery - indefinite quantity contracts.

Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) Program - The management approach includes the Program Management Office residing within NAVAIR 6.0 and Milestone Decision Authority delegated to NAVAIR 6.7. The evolutionary development approach will be used to execute requirements. Contracting for the prime integrator will be via competitively awarded cost plus fixed fee contracts.

**E. Performance Metrics**

Joint Technical Data Integration (JTDI) - Successful government testing of JTDI annual software release and system performance availability as defined in acquisition documentation. Marine Aviation Logistics Enterprise Information Technology (MAL-EIT)- Successful government testing of JTDI annual software release.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3167 / *Joint Technical Data Integration (JTDI)* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development for JTDI | MIPR | DTIC : Fort Belvior, VA | 2.489 | 0.434 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development/ Hardware Integration for Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) | C/CPFF | Wyle : Patuxent River, MD | 5.937 | 0.600 | Jan 2018 | 1.179 | Jan 2019 | 0.390 | Jan 2020 | - | | 0.390 | Continuing | Continuing | Continuing |
| Software Development/ Hardware Integration for MAL-EIT | C/T&M | Applied Research : Penn State | 1.015 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Prior year support no longer funded in the FYDP | Various | Various : Various | 15.326 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development/ Hardware Integration MAL-EIT | WR | NAWCAD : Patuxent River, MD | 1.153 | 0.178 | Nov 2017 | 0.395 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development/ Hardware Integration MAL-EIT | WR | NEDC : New Orleans, LA | 0.261 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Development/Software Integration - MAL-EIT | WR | NAWCWD : China Lake | 0.700 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Development/Software Integration - MAL-EIT | WR | NEDC : Patuxent River, MD | 0.045 | 0.099 | Oct 2017 | 0.100 | Oct 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development for JTDI | C/CPFF | Control Point Corporation : Patuxent River, MD | 0.000 | 0.000 | | 0.550 | Apr 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development/ Hardware Integration MAL-EIT | C/CPFF | TLOG SBJV : Patuxent River, MD | 0.000 | 0.185 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development for JTDI | C/CPFF | Wyle : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 2.929 | May 2020 | - | | 2.929 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 26.926 | 1.496 | | 2.224 | | 3.319 | | - | | 3.319 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

JTDI increase in FY20 will modernize and scale the standard data repository (SDR) and enterprise analytics infrastructure for CBM+ data to integrate additional weapon system platforms and provide core analytics at the edge. Funding will also support the integration with Agile Core Services (ACS) to achieve greater interoperability with other applications; control future fielding and sustainment costs; and enable rapid development, integration, and deployment of future system releases. As well as incorporate automated configuration control and improved inventory management of globally deployed technical data and IT assets.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation for MAL-EIT | WR | SPAWAR : Norfolk, VA | 1.629 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation for MAL-EIT | C/CPFF | Wyle : Patuxent River, MD | 0.886 | 0.149 | Jan 2018 | 0.272 | Jan 2019 | 0.090 | Jan 2020 | - | | 0.090 | Continuing | Continuing | Continuing |
| Prior year Test & Eval no longer funded in the FYDP | Various | Various : Various | 0.909 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation, MAL-EIT | WR | NAWCAD : Patuxent River, MD | 0.030 | 0.030 | Feb 2018 | 0.076 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation, MAL-EIT | WR | NSWC : Corona, CA | 0.025 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation JDTI | C/CPFF | Control Point Corporation : Patuxent River, MD | 0.000 | 0.000 | | 0.500 | Jan 2019 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation JDTI | C/CPFF | Wyle : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 1.577 | May 2020 | - | | 1.577 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.479 | 0.179 | | 0.848 | | 1.667 | | - | | 1.667 | Continuing | Continuing | N/A |

**Remarks**

JTDI increase will support testing of annual baseline releases and integration testing with authoritative sources of technical data and enterprise business systems.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3167 / *Joint Technical Data Integration (JTDI)* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support for Marine Aviation Logistics Enterprise Information Technology (MAL-EIT) | WR | SPAWAR : Norfolk, VA | 0.832 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Support MAL-EIT | WR | NAWCAD : Patuxent River, MD | 0.324 | 0.072 | Nov 2017 | 0.072 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Support MAL-EIT | C/CPFF | Wyle : Patuxent River, MD | 1.040 | 0.198 | Jan 2018 | 0.346 | Jan 2019 | 0.120 | Jan 2020 | - | | 0.120 | Continuing | Continuing | Continuing |
| Prior year Mgmt Svcs Cost no longer funded in the FYDP | Various | Various : Various | 0.473 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering Support - JTDI | WR | NAWCAD : Patuxent River, MD | 1.894 | 0.491 | Nov 2017 | 0.363 | Nov 2018 | 0.094 | Nov 2019 | - | | 0.094 | Continuing | Continuing | Continuing |
| Program Management Support - TRAVEL - MAL-EIT | WR | NAVAIR HQ : Patuxent River, MD | 0.106 | 0.026 | Oct 2017 | 0.030 | Oct 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Support MAL-EIT | WR | W4MK Armament RDEC : Pacatiny Arsenal, NJ | 0.019 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Systems Engineering Support - JTDI | C/CPFF | Wyle : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.345 | May 2020 | - | | 0.345 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 4.688 | 0.787 | | 0.811 | | 0.559 | | - | | 0.559 | Continuing | Continuing | N/A |

**Remarks**

JTDI increase will support the development, modernization, obsolescence, and cybersecurity mandated activities associated with a major release of fully deployed COTS-intensive JTDI system Version 2.0.6.5.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 35.093 | 2.462 | | 3.883 | | 5.545 | | - | | 5.545 | Continuing | Continuing | N/A |

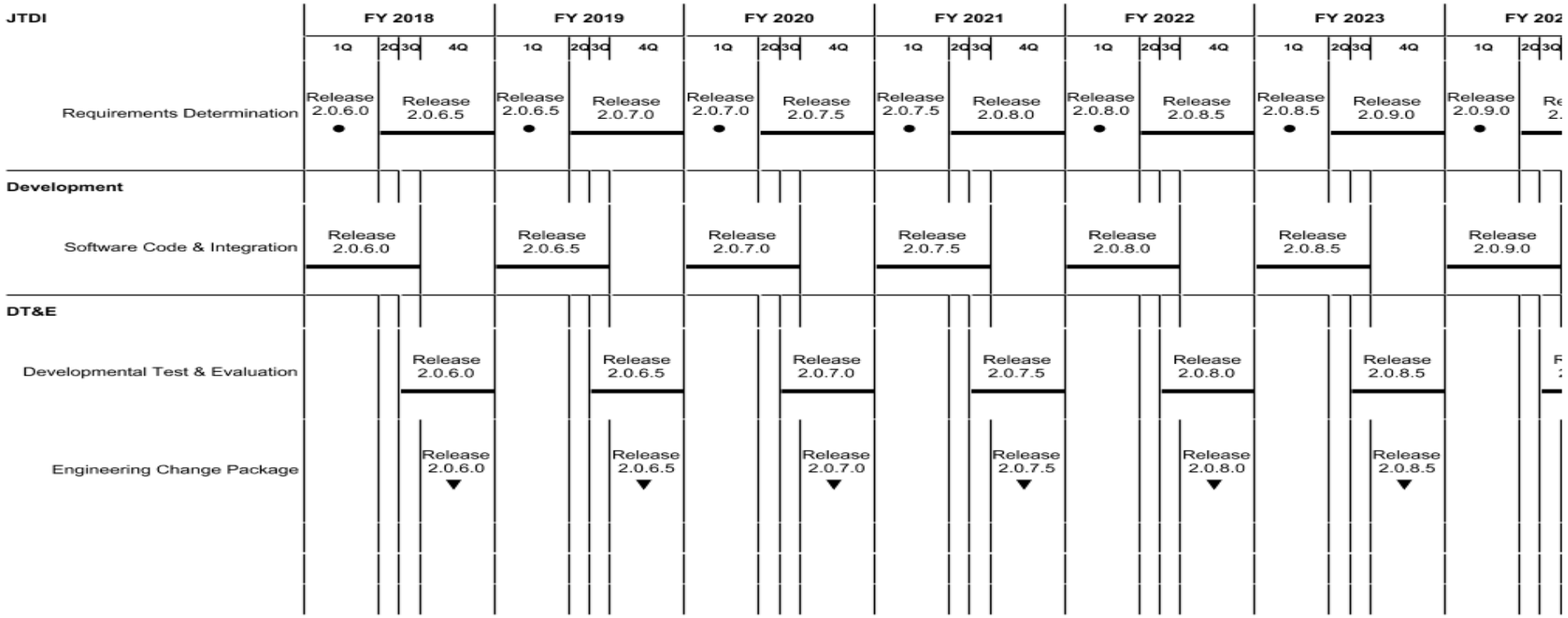
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3167 / *Joint Technical Data Integration (JTDI)* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

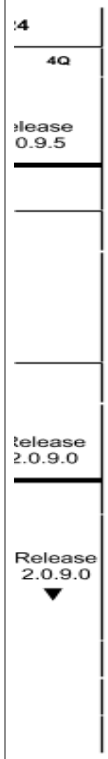
Footnotes:
(1) JTDI increase in FY20 will modernize and scale the standard data repository (SDR) and enterprise analytics infrastructure for CBM+ data to integrate additional weapon system platforms and provide core analytics at the edge. Funding will also support the integration with Agile Core Services (ACS) to achieve greater interoperability with other applications; control future fielding and sustainment costs; and enable rapid development, integration, and deployment of future system releases. As well as incorporate automated configuration control and improved inventory management of globally deployed technical data and IT assets.
(2) JTDI increase will support testing of annual baseline releases and integration testing with authoritative sources of technical data and enterprise business systems.
(3)JTDI increase will support the development, modernization, obsolescence, and cybersecurity mandated activities associated with a major release of fully deployed COTS-intensive JTDI system Version 2.0.6.5.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

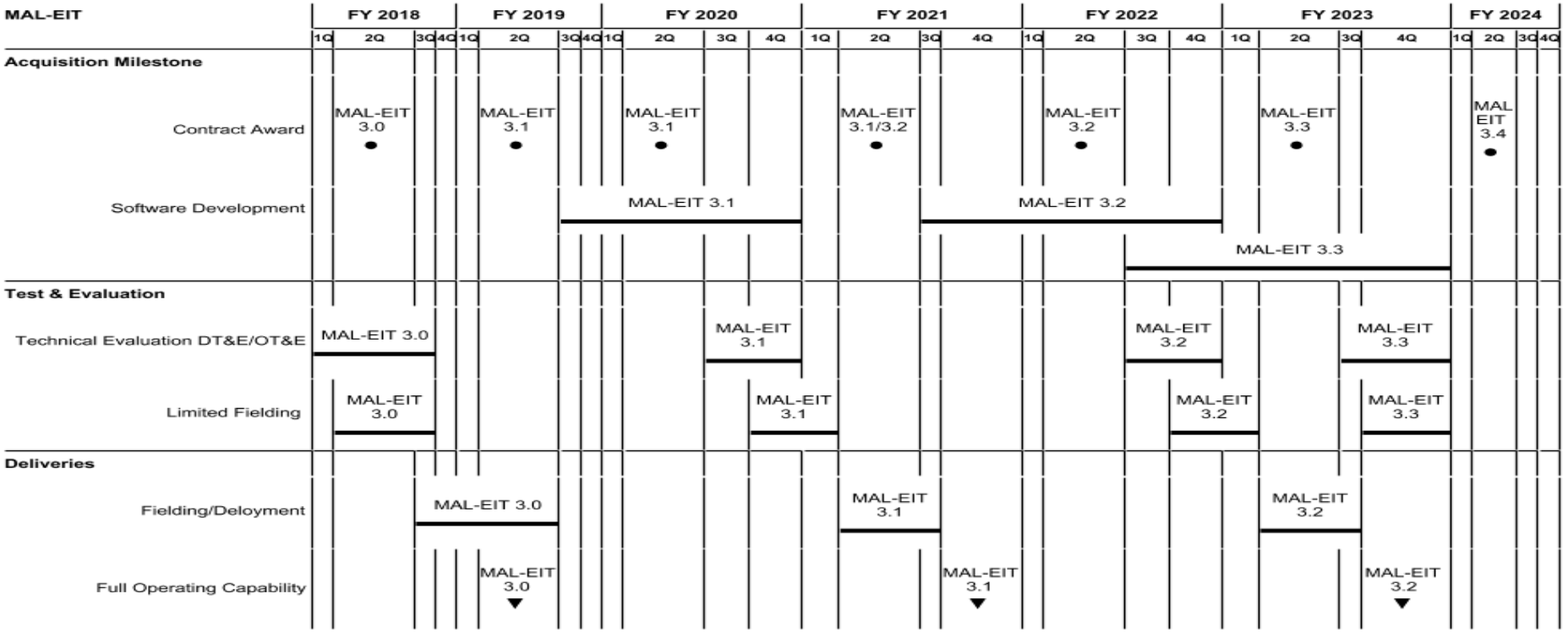



2020DON - 0605013N - 3167

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |




*2020DON - 0605013N - 3167*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JTDI*** | | | | |
| Requirements Determination: Release 2.0.6.5 | 2 | 2018 | 4 | 2018 |
| Requirements Determination: Release 2.0.7.0 | 2 | 2019 | 4 | 2019 |
| Requirements Determination: Release 2.0.7.5 | 2 | 2020 | 4 | 2020 |
| Requirements Determination: Release 2.0.8.0 | 2 | 2021 | 4 | 2021 |
| Requirements Determination: Release 2.0.8.5 | 2 | 2022 | 4 | 2022 |
| Requirements Determination: Release 2.0.9.0 | 2 | 2023 | 4 | 2023 |
| Requirements Determination: Release 2.0.9.5 | 2 | 2024 | 4 | 2024 |
| Requirements Determination: Contract Award, Release 2.0.6.0 | 1 | 2018 | 1 | 2018 |
| Requirements Determination: Contract Award, Release 2.0.6.5 | 1 | 2019 | 1 | 2019 |
| Requirements Determination: Contract Award, Release 2.0.7.0 | 1 | 2020 | 1 | 2020 |
| Requirements Determination: Contract Award, Release 2.0.7.5 | 1 | 2021 | 1 | 2021 |
| Requirements Determination: Contract Award, Release 2.0.8.0 | 1 | 2022 | 1 | 2022 |
| Requirements Determination: Contract Award, Release 2.0.8.5 | 1 | 2023 | 1 | 2023 |
| Requirements Determination: Contract Award, Release 2.0.9.0 | 1 | 2024 | 1 | 2024 |
| Development: Software Code & Integration: Release 2.0.6.0 | 1 | 2018 | 3 | 2018 |
| Development: Software Code & Integration: Release 2.0.6.5 | 1 | 2019 | 3 | 2019 |
| Development: Software Code & Integration: Release 2.0.7.0 | 1 | 2020 | 3 | 2020 |
| Development: Software Code & Integration: Release 2.0.7.5 | 1 | 2021 | 3 | 2021 |
| Development: Software Code & Integration: Release 2.0.8.0 | 1 | 2022 | 3 | 2022 |
| Development: Software Code & Integration: Release 2.0.8.5 | 1 | 2023 | 3 | 2023 |
| Development: Software Code & Integration: Release 2.0.9.0 | 1 | 2024 | 3 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| DT&E: Developmental Test & Evaluation: Release 2.0.6.0 | 3 | 2018 | 4 | 2018 |
| DT&E: Developmental Test & Evaluation: Release 2.0.6.5 | 3 | 2019 | 4 | 2019 |
| DT&E: Developmental Test & Evaluation: Release 2.0.7.0 | 3 | 2020 | 4 | 2020 |
| DT&E: Developmental Test & Evaluation: Release 2.0.7.5 | 3 | 2021 | 4 | 2021 |
| DT&E: Developmental Test & Evaluation: Release 2.0.8.0 | 3 | 2022 | 4 | 2022 |
| DT&E: Developmental Test & Evaluation: Release 2.0.8.5 | 3 | 2023 | 4 | 2023 |
| DT&E: Developmental Test & Evaluation: Release 2.0.9.0 | 3 | 2024 | 4 | 2024 |
| DT&E: Engineering Change Package: Release 2.0.6.0 | 4 | 2018 | 4 | 2018 |
| DT&E: Engineering Change Package: Release 2.0.6.5 | 4 | 2019 | 4 | 2019 |
| DT&E: Engineering Change Package: Release 2.0.7.0 | 4 | 2020 | 4 | 2020 |
| DT&E: Engineering Change Package: Release 2.0.7.5 | 4 | 2021 | 4 | 2021 |
| DT&E: Engineering Change Package: Release 2.0.8.0 | 4 | 2022 | 4 | 2022 |
| DT&E: Engineering Change Package: Release 2.0.8.5 | 4 | 2023 | 4 | 2023 |
| DT&E: Engineering Change Package: Release 2.0.9.0 | 4 | 2024 | 4 | 2024 |
| ***MAL-EIT*** | | | | |
| Acquisition Milestone: Contract Award: Contract Award (6) | 2 | 2018 | 2 | 2018 |
| Acquisition Milestone: Contract Award: Contract Award (7) | 2 | 2019 | 2 | 2019 |
| Acquisition Milestone: Contract Award: Contract Award (8) | 2 | 2020 | 2 | 2020 |
| Acquisition Milestone: Contract Award: Contract Award (9) | 2 | 2021 | 2 | 2021 |
| Acquisition Milestone: Contract Award: Contract Award (10) | 2 | 2022 | 2 | 2022 |
| Acquisition Milestone: Contract Award: Contract Award (11) | 2 | 2023 | 2 | 2023 |
| Acquisition Milestone: Contract Award: Contract Award (12) | 2 | 2024 | 2 | 2024 |
| Acquisition Milestone: Software Development: Software Development (4) | 3 | 2019 | 4 | 2020 |
| Acquisition Milestone: Software Development: Software Development (5) | 3 | 2021 | 4 | 2022 |
| Acquisition Milestone: Software Development: Software Development (6) | 3 | 2022 | 4 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3167 / *Joint Technical Data Integration (JTDI)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test & Evaluation: Technical Evaluation DT&E/OT&E: Technical Evaluation DT&E/ OT&E (4) | 1 | 2018 | 3 | 2018 |
| Test & Evaluation: Technical Evaluation DT&E/OT&E: Technical Evaluation DT&E/ OT&E (5) | 3 | 2020 | 4 | 2020 |
| Test & Evaluation: Technical Evaluation DT&E/OT&E: Technical Evaluation DT&E/ OT&E (6) | 3 | 2022 | 4 | 2022 |
| Test & Evaluation: Technical Evaluation DT&E/OT&E: Technical Evaluation DT&E/ OT&E (7) | 3 | 2023 | 4 | 2023 |
| Test & Evaluation: Limited Fielding: Limited Fielding (3) | 2 | 2018 | 3 | 2018 |
| Test & Evaluation: Limited Fielding: Limited Fielding (4) | 4 | 2020 | 1 | 2021 |
| Test & Evaluation: Limited Fielding: Limited Fielding (5) | 4 | 2022 | 1 | 2023 |
| Test & Evaluation: Limited Fielding: Limited Fielding (6) | 4 | 2023 | 4 | 2023 |
| Deliveries: Fielding/Deloyment: Fielding/Deployment (2) | 3 | 2018 | 2 | 2019 |
| Deliveries: Fielding/Deloyment: Fielding/Deployment (3) | 2 | 2021 | 3 | 2021 |
| Deliveries: Fielding/Deloyment: Fielding/Deployment (4) | 2 | 2023 | 3 | 2023 |
| Deliveries: Full Operating Capability: Full Operating Capability (3) | 2 | 2019 | 2 | 2019 |
| Deliveries: Full Operating Capability: Full Operating Capability (4) | 4 | 2021 | 4 | 2021 |
| Deliveries: Full Operating Capability: Full Operating Capability (5) | 4 | 2023 | 4 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3185 / *Joint Airlift Information System (JALIS)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3185: *Joint Airlift Information System (JALIS)* | 2.014 | 0.335 | 0.353 | 0.349 | - | 0.349 | 0.356 | 0.364 | 0.372 | 0.380 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

JALIS is an operational scheduling and aircraft management system that facilitates real-time data analysis. JALIS is a critical element in the management of DoD air logistics assets. JALIS allows:

(1) DoD Service Personnel to submit airlift requirements for DoD Personnel and cargo
(2) Air Logistics Flying Units to communicate their aircraft availability in a real-time graphic display
(3) Designated Scheduling Organizations to compare airlift requirements with available aircraft
(4) Designated Scheduling Organizations to create mission assignments

JALIS informs applicable users of mission details and modifications by using a combination of system displays and email updates. JALIS is geographically distributed and has a user base in excess of 4,000 members. JALIS facilitates the movement of thousands of DoD Personnel and tons of cargo annually in support of the following:

(1) Navy Unique Fleet Essential Airlift
(2) Army's Operational Support Airlift Agency (OSAA)
(3) United States Transportation Command (USTRANSCOM)
(4) United States Marine Corps (USMC)

The Joint Chiefs of Staff mandates JALIS as the official DoD Airlift scheduling system for Operational Support Airlift (OSA). JALIS meets the requirement for multi-service coordinated Air Logistics scheduling as directed by Chairman, Joint Chiefs of Staff. The Navy is designated as lead agency for sponsoring and funding the JALIS program.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint Air Logistic Information System (JALIS) | 0.335 | 0.353 | 0.349 | 0.000 | 0.349 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>1. Create capability to archive historical flight and airlift request records, to include full querying and reporting functions. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| 2. Create new query and analysis tools to automatically identify solutions for consolidating airlift requests and scheduled flights<br>3. Begin design and developments of new user interface displays that will consolidate functions currently distributed throughout the system<br>***FY 2020 Base Plans:***<br>1. Continue to build capability to archive historical flight and airlift request records, to include full querying and reporting functions.<br>2. Continue development of new query and analysis tools to automatically identify solutions for consolidating airlift requests and scheduled flights<br>3. Continue design and development of new user interface displays that will consolidate functions currently distributed throughout the system<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $4K. Funding profile reduced by $4K due to pricing. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.335 | 0.353 | 0.349 | 0.000 | 0.349 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

As a general rule, IT development programs use an agile software development methodology therefore milestones, tasks and phases are often conducted in parallel vice sequentially.

Contract activities will focus on developing the following capabilities:

(1) Improved functionality for flight scheduling
(2) Improved coordination between JALIS scheduling organizations
(3) Integration of JALIS and JALIS Dashboard functions

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |

**E. Performance Metrics**

Performance metrics for JALIS include:

(1) Completion of system change request requirements enabling production of articles as itemized in Section B.
(2) Increase operational efficiency
(a) Reduce time to train scheduling personnel by 15%
(b) Reduce time to search for scheduling solutions 10%
(c) Reduce time to train new JALIS users by 20%

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3185 / *Joint Airlift Information System (JALIS)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development, Analysis and QA support | C/CPFF | SPAWAR : New Orleans, LA | 2.014 | 0.335 | Feb 2018 | 0.353 | Feb 2019 | 0.349 | Feb 2020 | - | | 0.349 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.014 | 0.335 | | 0.353 | | 0.349 | | - | | 0.349 | Continuing | Continuing | N/A |

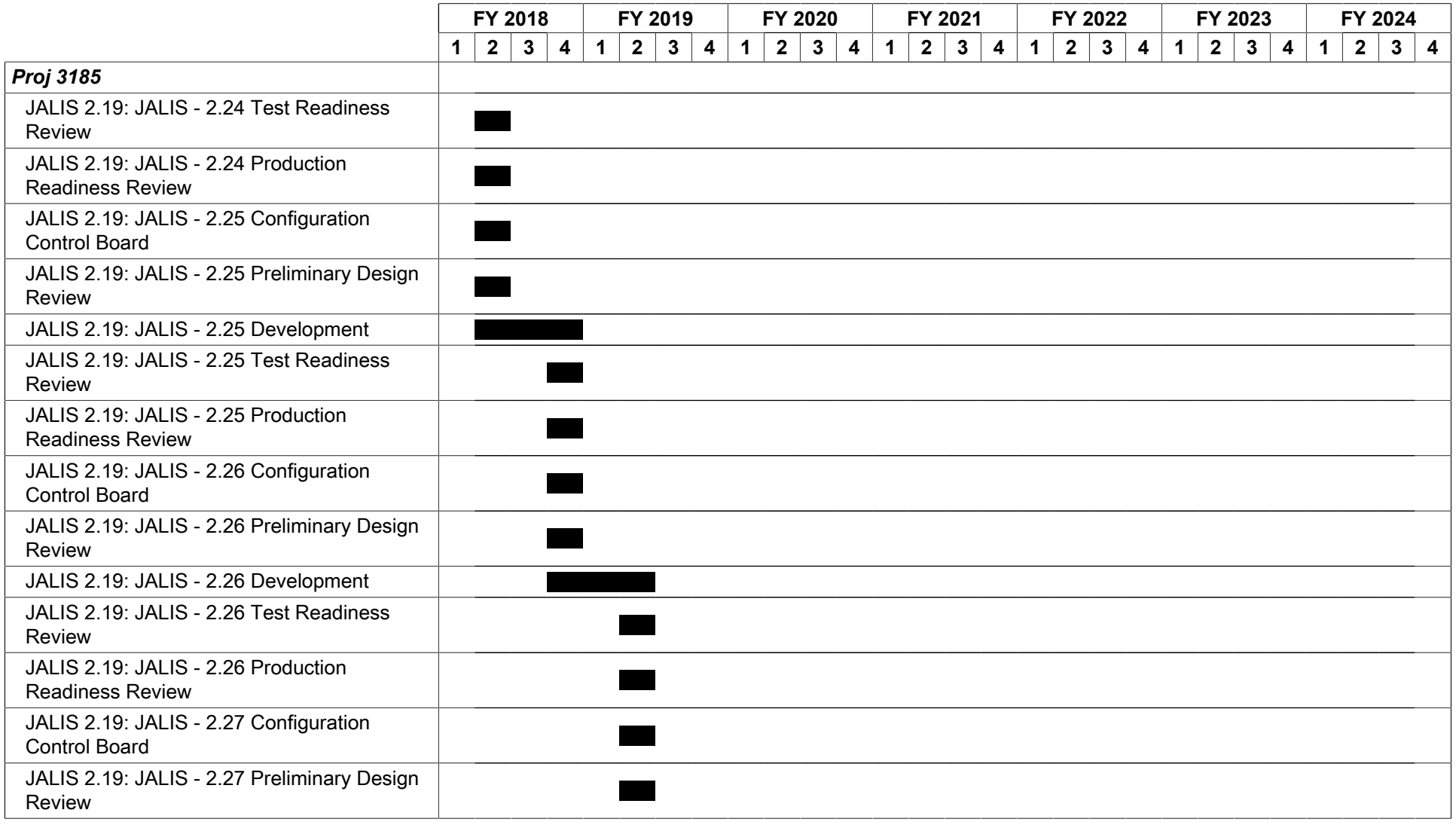
**Remarks**

Development efforts are focused on improving system querying and reporting performance, as well as automating and simplifying common user tasks.

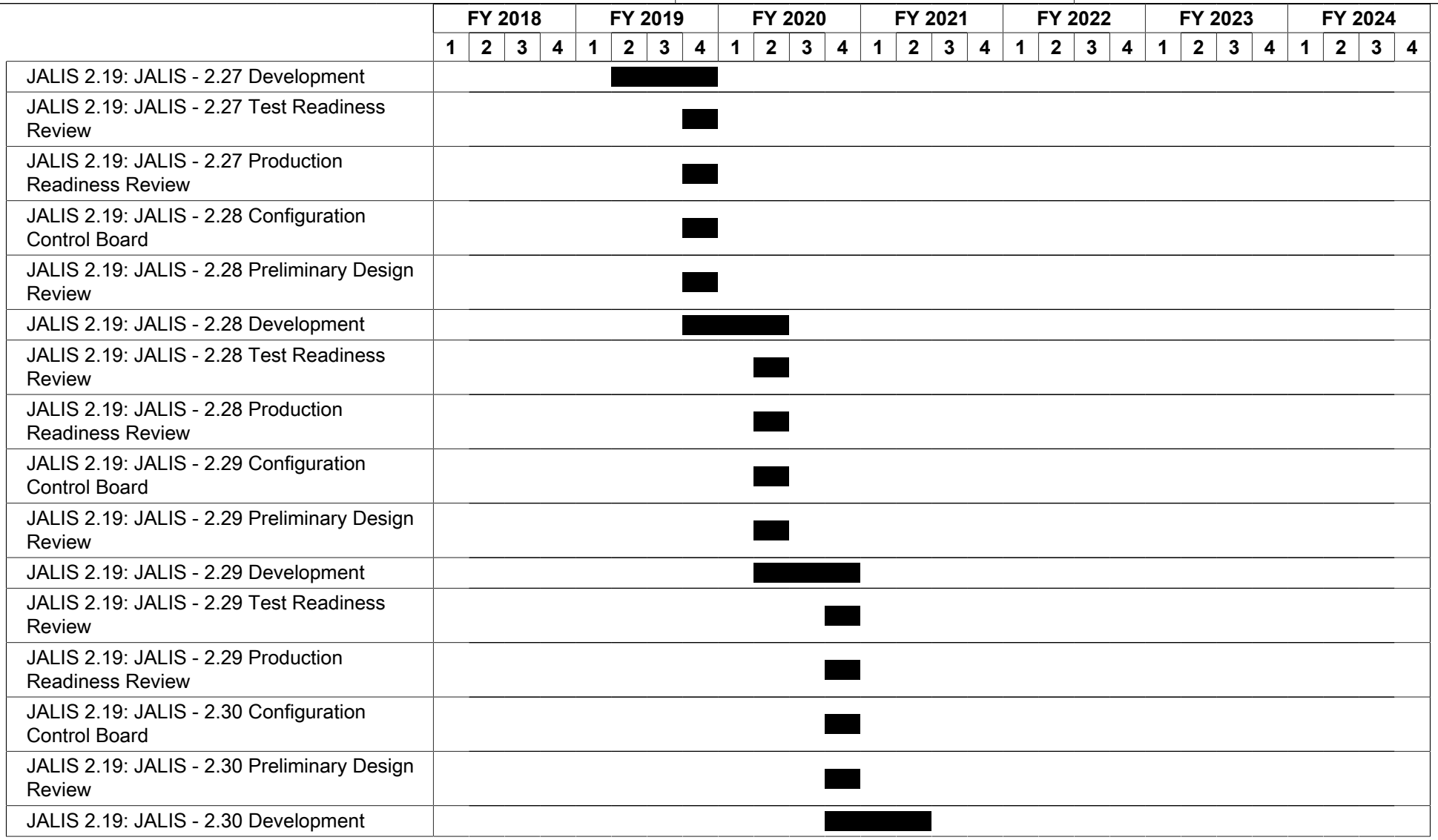
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 2.014 | 0.335 | | 0.353 | | 0.349 | | - | | 0.349 | Continuing | Continuing | N/A |

**Remarks**

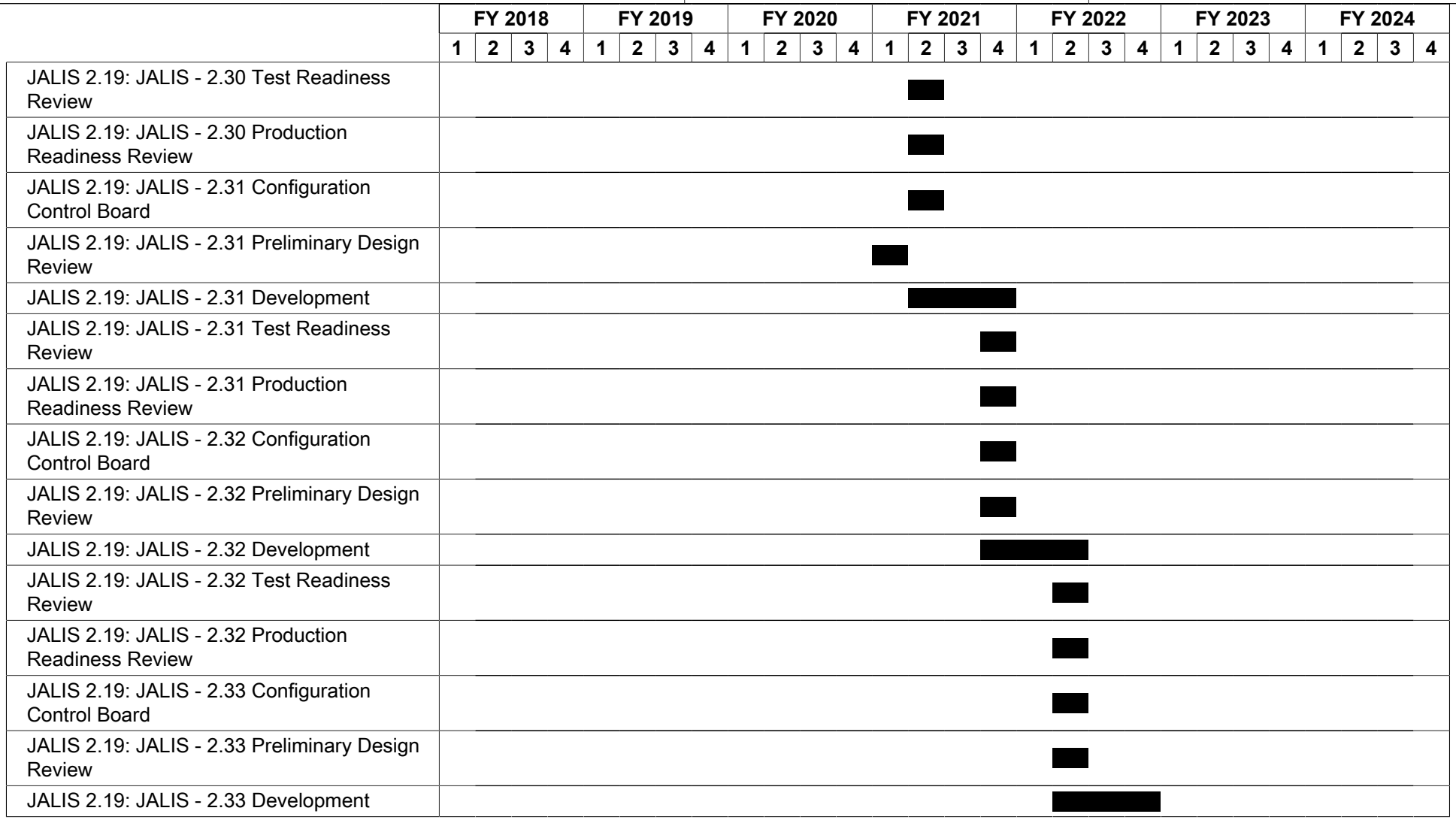
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |



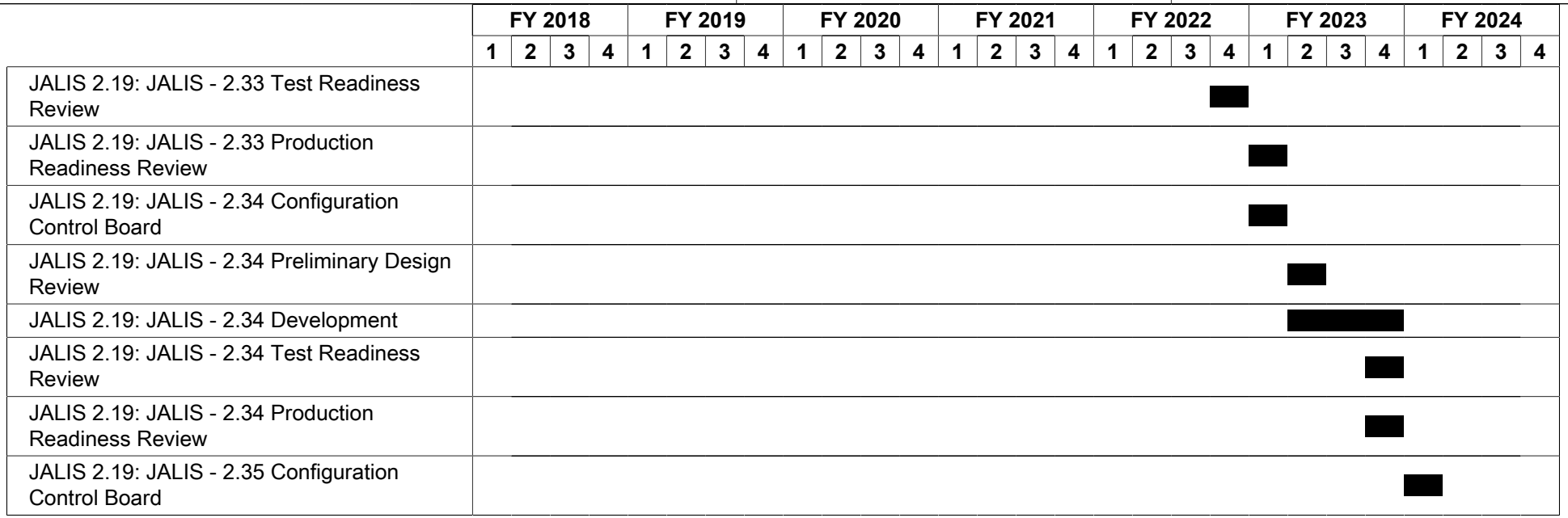
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3185*** | | | | |
| JALIS 2.19: JALIS - 2.24 Test Readiness Review | 2 | 2018 | 2 | 2018 |
| JALIS 2.19: JALIS - 2.24 Production Readiness Review | 2 | 2018 | 2 | 2018 |
| JALIS 2.19: JALIS - 2.25 Configuration Control Board | 2 | 2018 | 2 | 2018 |
| JALIS 2.19: JALIS - 2.25 Preliminary Design Review | 2 | 2018 | 2 | 2018 |
| JALIS 2.19: JALIS - 2.25 Development | 2 | 2018 | 4 | 2018 |
| JALIS 2.19: JALIS - 2.25 Test Readiness Review | 4 | 2018 | 4 | 2018 |
| JALIS 2.19: JALIS - 2.25 Production Readiness Review | 4 | 2018 | 4 | 2018 |
| JALIS 2.19: JALIS - 2.26 Configuration Control Board | 4 | 2018 | 4 | 2018 |
| JALIS 2.19: JALIS - 2.26 Preliminary Design Review | 4 | 2018 | 4 | 2018 |
| JALIS 2.19: JALIS - 2.26 Development | 4 | 2018 | 2 | 2019 |
| JALIS 2.19: JALIS - 2.26 Test Readiness Review | 2 | 2019 | 2 | 2019 |
| JALIS 2.19: JALIS - 2.26 Production Readiness Review | 2 | 2019 | 2 | 2019 |
| JALIS 2.19: JALIS - 2.27 Configuration Control Board | 2 | 2019 | 2 | 2019 |
| JALIS 2.19: JALIS - 2.27 Preliminary Design Review | 2 | 2019 | 2 | 2019 |
| JALIS 2.19: JALIS - 2.27 Development | 2 | 2019 | 4 | 2019 |
| JALIS 2.19: JALIS - 2.27 Test Readiness Review | 4 | 2019 | 4 | 2019 |
| JALIS 2.19: JALIS - 2.27 Production Readiness Review | 4 | 2019 | 4 | 2019 |
| JALIS 2.19: JALIS - 2.28 Configuration Control Board | 4 | 2019 | 4 | 2019 |
| JALIS 2.19: JALIS - 2.28 Preliminary Design Review | 4 | 2019 | 4 | 2019 |
| JALIS 2.19: JALIS - 2.28 Development | 4 | 2019 | 2 | 2020 |
| JALIS 2.19: JALIS - 2.28 Test Readiness Review | 2 | 2020 | 2 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| JALIS 2.19: JALIS - 2.28 Production Readiness Review | 2 | 2020 | 2 | 2020 |
| JALIS 2.19: JALIS - 2.29 Configuration Control Board | 2 | 2020 | 2 | 2020 |
| JALIS 2.19: JALIS - 2.29 Preliminary Design Review | 2 | 2020 | 2 | 2020 |
| JALIS 2.19: JALIS - 2.29 Development | 2 | 2020 | 4 | 2020 |
| JALIS 2.19: JALIS - 2.29 Test Readiness Review | 4 | 2020 | 4 | 2020 |
| JALIS 2.19: JALIS - 2.29 Production Readiness Review | 4 | 2020 | 4 | 2020 |
| JALIS 2.19: JALIS - 2.30 Configuration Control Board | 4 | 2020 | 4 | 2020 |
| JALIS 2.19: JALIS - 2.30 Preliminary Design Review | 4 | 2020 | 4 | 2020 |
| JALIS 2.19: JALIS - 2.30 Development | 4 | 2020 | 2 | 2021 |
| JALIS 2.19: JALIS - 2.30 Test Readiness Review | 2 | 2021 | 2 | 2021 |
| JALIS 2.19: JALIS - 2.30 Production Readiness Review | 2 | 2021 | 2 | 2021 |
| JALIS 2.19: JALIS - 2.31 Configuration Control Board | 2 | 2021 | 2 | 2021 |
| JALIS 2.19: JALIS - 2.31 Preliminary Design Review | 1 | 2021 | 1 | 2021 |
| JALIS 2.19: JALIS - 2.31 Development | 2 | 2021 | 4 | 2021 |
| JALIS 2.19: JALIS - 2.31 Test Readiness Review | 4 | 2021 | 4 | 2021 |
| JALIS 2.19: JALIS - 2.31 Production Readiness Review | 4 | 2021 | 4 | 2021 |
| JALIS 2.19: JALIS - 2.32 Configuration Control Board | 4 | 2021 | 4 | 2021 |
| JALIS 2.19: JALIS - 2.32 Preliminary Design Review | 4 | 2021 | 4 | 2021 |
| JALIS 2.19: JALIS - 2.32 Development | 4 | 2021 | 2 | 2022 |
| JALIS 2.19: JALIS - 2.32 Test Readiness Review | 2 | 2022 | 2 | 2022 |
| JALIS 2.19: JALIS - 2.32 Production Readiness Review | 2 | 2022 | 2 | 2022 |
| JALIS 2.19: JALIS - 2.33 Configuration Control Board | 2 | 2022 | 2 | 2022 |
| JALIS 2.19: JALIS - 2.33 Preliminary Design Review | 2 | 2022 | 2 | 2022 |
| JALIS 2.19: JALIS - 2.33 Development | 2 | 2022 | 4 | 2022 |
| JALIS 2.19: JALIS - 2.33 Test Readiness Review | 4 | 2022 | 4 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3185 / *Joint Airlift Information System (JALIS)* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| JALIS 2.19: JALIS - 2.33 Production Readiness Review | 1 | 2023 | 1 | 2023 |
| JALIS 2.19: JALIS - 2.34 Configuration Control Board | 1 | 2023 | 1 | 2023 |
| JALIS 2.19: JALIS - 2.34 Preliminary Design Review | 2 | 2023 | 2 | 2023 |
| JALIS 2.19: JALIS - 2.34 Development | 2 | 2023 | 4 | 2023 |
| JALIS 2.19: JALIS - 2.34 Test Readiness Review | 4 | 2023 | 4 | 2023 |
| JALIS 2.19: JALIS - 2.34 Production Readiness Review | 4 | 2023 | 4 | 2023 |
| JALIS 2.19: JALIS - 2.35 Configuration Control Board | 1 | 2024 | 1 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3432 / *NMMES-TR* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3432: *NMMES-TR* | 0.000 | 0.000 | 33.049 | 77.351 | - | 77.351 | 119.323 | 122.603 | 54.100 | 55.182 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

The NMMES Technical Refresh (NMMES-TR) program replaces current GOTS software with cloud-based COTS software. NMMES-TR is not a new start; it was formerly a project under Navy Maritime Maintenance Enterprise Solution (NMMES) and reported under Project 2904 of PE 0605013N prior to FY19. The NMMES and NMMES-TR projects complement each other to provide both sustainment of the existing systems and the initial system design, development, and migration to a cloud-based commercial solution. Both programs are essential to build the integrated environment so the existing applications can transition to the follow-on technical refresh replacement solution.

**A. Mission Description and Budget Item Justification**

The NMMES-TR is an Information Technology (IT) acquisition program that will provide a sustainable enterprise IT solution leveraging Commercial, Off-The-Shelf (COTS) technology and business processes for shore maritime maintenance. Unlike the uniquely custom designed status quo toolset, the NMMES-TR solution will not implement extensive product customization to match the current maintenance business processes; but rather, maintenance business processes will be modified to match the software solution, thereby adopting industry best practices. Accordingly, the solution will be more flexible to the BPR process, and more agile to capitalize on efficiency improvement opportunities and innovations. This will facilitate alignment with the Optimized Fleet Response Plan (OFRP) by assisting the maintenance activities with accomplishing assigned tasks as planned in order that submarines, aircraft carriers, and surface ships can properly train and deploy on schedule. NMMES-TR will also provide a modern solution that will be more effective and efficient in combating cybersecurity threats, and capable of continuous monitoring.

The NMMES-TR initiative has been a pre-acquisition Defense Business System (DBS) effort for the past three years funded Line Item 0605013N, Project Number 2904. In April 2017, the Department approved the NMMES-TR initiative to commence as an acquisition program, resulting in the establishment of a new Project Number 3432 beginning in FY19.

In FY18, the program began working toward the award of a System Integrator contract. Major milestones in FY18 include completion of Gates 3 and 4. Gate 5 is scheduled for Q2 FY19 to be followed by an Acquisition Authority to Proceed to release the Request for Proposal. The program office also conducted a review of the schedule in response to the 19 month schedule risk identified by NCCA during the Gate 4 Cost Review Board (CRB) and formalized in the approved Component Cost Position (CCP) dated 12 Apr 2018. After careful review of the scheduled activities, the timeline for Increment 1 and the total program were increased by a combined total of 14 months to mitigate the stated risk.

The FY19 funding increase reflects a risk reduction effort to award a contract to provide a Cloud-based Capability Integration Platform (CIP) environment similar to what will be used to integrate core NMMES financial management, human capital management, digital shipbuilding environment, and the cloud-based COTS solution that provides the Maintenance, Repair and Overhaul (MRO) and Portfolio and Project Management (PPM) functionality in support of the Shore Maritime Maintenance community mission. Additionally, FY19 supports higher levels of effort associated with inherently Governmental efforts (i.e. contracting, acquisition planning & source

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

selection, financial and business management, engineering, testing, logistics, etc.), and Contractor Support Services (i.e. systems engineering, organizational change management, logistics, deployment support, training, etc.). These activities support the award of the System Integrator contract planned for Q2 FY20 following a competitive source selection.

The FY20 funding increase reflects the award of a single prime System Integrator contract and a MAC award for all commercial items including cloud hosting, integration environment layers, business applications, and other commercial items during Q2. The SI and the MAC vendors will begin the requirements and design review of the NMMES-TR solution to support a Critical Design Review scheduled for FY21 Q1.

The NMMES-TR program office is staffed by government personnel from NAVSEA and SPAWAR SYSCOMS and their supporting Warfare/Systems Centers on a reimbursable basis. Based on a cross-SYSCOM Operating Agreement, the FY19 budget includes funding for inherently governmental efforts in the following functional areas:

a. SPAWAR HQ: Contracting, Legal, Engineering and Cybersecurity
b. SPAWAR Systems Center Atlantic: Engineering and Acquisition
c. NWSC Dahlgren Division: Program Cost Estimating and Analysis
d. Naval Sea Logistics Center (NSLC): Acquisition, Financial and Business Management, Testing and Logistics

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Systems Integration and MRO/PPM Solution | 0.000 | 33.049 | 77.351 | 0.000 | 77.351 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>The NMMES-TR initiative has been a pre-acquisition Defense Business System (DBS) effort for the past three years funded by Line Item 0605013N, Project Number 2904. In April 2017, the Department approved the NMMES-TR initiative to commence as an acquisition program, resulting in the establishment of a new Project Number 3432 beginning in FY19. On 10 Jun 2018, the USD A&S designated the NMMES-TR as a BCAT 1 DBS program to the DON. NMMES-TR will be formally baselined as a BCAT I Program of Record as of Gate 6 planned for FY20 Q2, therefore FY19 efforts continue to support the initial acquisition planning and the standup of the risk reduction project to develop a commercial cloud prototype environment for the NMMES-TR program. These preparatory efforts in FY19 support a full and open competition for a System Integrator (SI) and Multiple Award Contract (MAC) for commercial items scheduled for award in FY20 Q2. Additional FY19 efforts include fully staffing the program office and establishing the Community of Practice with the shipyards, regional maintenance centers, Trident refit and ship repair facilities. | | | | | |
| ***FY 2020 Base Plans:***<br>Upon successful completion of the Gate 6 Review, the NMMES-TR program will conclude pre-acquisition designation preparatory efforts. The NMMES-TR PMO will then award a single prime System Integrator contract | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and a MAC award for all commercial items including cloud hosting, integration environment layers, business applications, and other commercial items during Q2. The SI and the MAC vendors will begin the requirements and design review of the NMMES-TR solution to support a Critical Design Review scheduled for FY21 Q1. These activities will substantially increase the level of effort to design the system solution and conduct prototype demonstrations.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $44.302M increase from FY19 to FY20 reflects the award a single prime System Integrator contract and a MAC award for all commercial items including cloud hosting, integration environment layers, business applications, and other commercial items during Q2. The SI and the MAC vendors will begin the requirements and design review of the NMMES-TR solution to support a Critical Design Review scheduled for FY21 Q1. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 33.049 | 77.351 | 0.000 | 77.351 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Based on the results of the Analysis of Alternatives completed in FY17, NMMES-TR will acquire cloud hosted COTS applications using an incremental approach based on the required functionality for the shore maritime maintenance community. This program will integrate the following Mission Tasks; Maintenance, Repair and Overhaul (MRO), Project and Portfolio Management, Supply Chain Management, Environmental Safety and Occupational Health (ESOH) and Data Analytics. The program will use a third-party Systems Integrator to integrate existing legacy systems with cloud hosted COTS applications that will be deployed to the Navy's Regional Maintenance Centers, public naval shipyards, ship repair facilities, and other maintenance activities. The incremental approach provides off ramps in the event that not all functionality can be delivered within the cost/schedule/performance constraints of the program.

**E. Performance Metrics**

SPM 1.0 OPERATIONAL AVAILABILITY:
Operational availability is defined as the percentage of time that NMMES-TR is operationally capable of performing an assigned mission. The operational availability SPM measures the degree to which a system can be supported both in terms of its inherent design characteristics of reliability, availability, maintainability, and operational effectiveness, and the efficacy of the various elements of product support, tools, and training. NMMES-TR will provide a supportable framework with a direct focus on COTS.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

SPM 1.1 Reliability - Reliability represents the probability the system will operate without failure over a specified period of time. Reliability accounts for Unscheduled Maintenance.

Mission Critical Functions Threshold
99.5% at LD ATP
99.9% at FD ATP

Mission Critical Functions Objective
97.8% At LD ATP
99.9% at FD ATP

SPM 1.2 Availability - This represents the ability of an end user to access and use the service provided by the system. A Consumer Facing availability requirement is a promise to consumers that they will be able to use the service a certain percentage of time. Availability downtime includes both scheduled and unscheduled maintenance. NMMES-TR must be operationally available to support the maritime maintenance mission.

Mission Critical Functions Threshold
AO > 86.2% at LD ATP
AO > 96.6% at FD ATP

Mission Critical Functions Objective
AO > 98.3% at LD ATP
AO > 99.3% at FD ATP

SPM 1.3 Maintainability - The system's ability to be retained in, or restored to, a specified condition when maintenance is performed by personnel with a specified skill, using prescribed procedures and resources, and at each prescribed level of maintenance and repair. Mean time to repair (MTTR) is a basic technical measure of maintainability. The service may be made unavailable for scheduled maintenance, as long as schedule maintenance intervals last no longer than four hours and occur no more frequently than once per month.

Mission Critical Functions Threshold
MTTR < or equal to 6 hrs at LD ATP
MTTR < or equal to 2 hrs at FD ATP

Mission Critical Functions Objective
MTTR < or equal to 4 hrs at LD ATP

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

MTTR < or equal to 1 hrs at FD ATP

SPM 2.0 SCALABILITY:
Scalability is defined as the capability of a system, network, or process to handle a growing amount of work or its potential to enlarge to accommodate growth. NMMES-TR must be able to support enterprise level usage above 51,000 users worldwide with 25,000 concurrent users. NMMES-TR will also provide scheduling, monitoring, and tracking (SMT) of an upwards of 300,000 individual tasks within a single project for a single site (public NSY or RMC). The dynamic usage solutions will also have the capacity to scale down based on user demand, reducing system resource demand when the high volume is not required. Elastic provisioning and service management targets real end users and mission needs for functionality as the services evolve over time.

SPM 2.1 Dynamic Users - NMMES-TR must be able to support enterprise level usage of at least 51,000 users NMMES-TR must be designed to support user growth.

User Accounts Threshold
> 10,000 at LD ATP
> 51,000 at FD ATP

User Accounts Objective
> 20,000 at LD ATP
> 55,000 at FD ATP

SPM 2.2 Concurrent Users - NMMES-TR must support concurrent users without degradation in System Response Time.

Threshold: > 50% of total users
Objective: > 75% of total users

SPM 2.3 Resources/Project SMT Capacity - NMMES-TR must support scheduling and critical chain project management tracking of at least 300,000 individual tasks within a single project for a single site (public NSY or RMC). NMMES-TR must be capable of providing a 50% surge in the level of user accounts.

Project Tasks Threshold
> 75,000 Activity Tasks per Project at LD ATP and > or equal to 100,000 Activity Tasks per Project at FD ATP
> 150,000 Detail Level Tasks per Project at LD ATP and > or equal to 400,000 Detail Level Tasks per Project at FD ATP
> or equal to 75% Surge Capacity in Level of User Growth at LD ATP and FD ATP

Project Tasks Objective
> or equal to 100,000 Activity Tasks per Project at LD ATP and FD ATP
> or equal to 400,000 Detail level Tasks per Project at LD ATP and FD ATP

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

> or equal to 75% Surge capacity in Level of User Growth at LD ATP and FD ATP

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Risk Reduction Prototype | SS/CPFF | TBD : Not Specified | 0.000 | 0.000 | | 17.350 | May 2019 | 4.551 | May 2020 | - | | 4.551 | Continuing | Continuing | Continuing |
| Systems Integrator | C/IDIQ | TBD : Not Specified | 0.000 | 0.000 | | 0.000 | | 38.600 | Mar 2020 | - | | 38.600 | 0.000 | 38.600 | - |
| Applications & Commercial Items | C/IDIQ | TBD : Not Specified | 0.000 | 0.000 | | 0.000 | | 15.600 | May 2020 | - | | 15.600 | 0.000 | 15.600 | - |
| Risk Reduction Pilot | C/CPFF | Kapsuum : WNY | 0.000 | 0.000 | | 2.500 | Sep 2019 | 2.600 | Sep 2020 | - | | 2.600 | 0.000 | 5.100 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 19.850 | | 61.351 | | - | | 61.351 | Continuing | Continuing | N/A |

**Remarks**

Growth in FY20 product development support activities include the configuration and integration of cloud hosted COTS applications with NMMES legacy systems migration to a cloud hosted environment. Specific tasks include the Capability Integration Platform, the Maintenance Repair and Overhaul (RMO) solution for the Regional Maintenance Centers (RMCs) and Naval Shipyards, Supply Chain Management, Data Analytics and Business Intelligence, Asset Management, ESOH, Laboratory Management, and the Technical Refresh of the MRO Work Brokering and Requirements Management system.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PMO Support | Various | Various : WNY & Norfolk | 0.000 | 0.000 | | 9.900 | Mar 2019 | 10.000 | Jun 2020 | - | | 10.000 | Continuing | Continuing | Continuing |
| Community of Practice | WR | Various : Various | 0.000 | 0.000 | | 3.299 | Mar 2019 | 6.000 | Mar 2020 | - | | 6.000 | 0.000 | 9.299 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 13.199 | | 16.000 | | - | | 16.000 | Continuing | Continuing | N/A |

**Remarks**

Funding supports the Program Management Office contractors and the establishment of the Community of Practice with the shipyards, regional maintenance centers, Trident refit and ship repair facilities.

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 33.049 | | 77.351 | | - | | 77.351 | Continuing | Continuing | N/A |

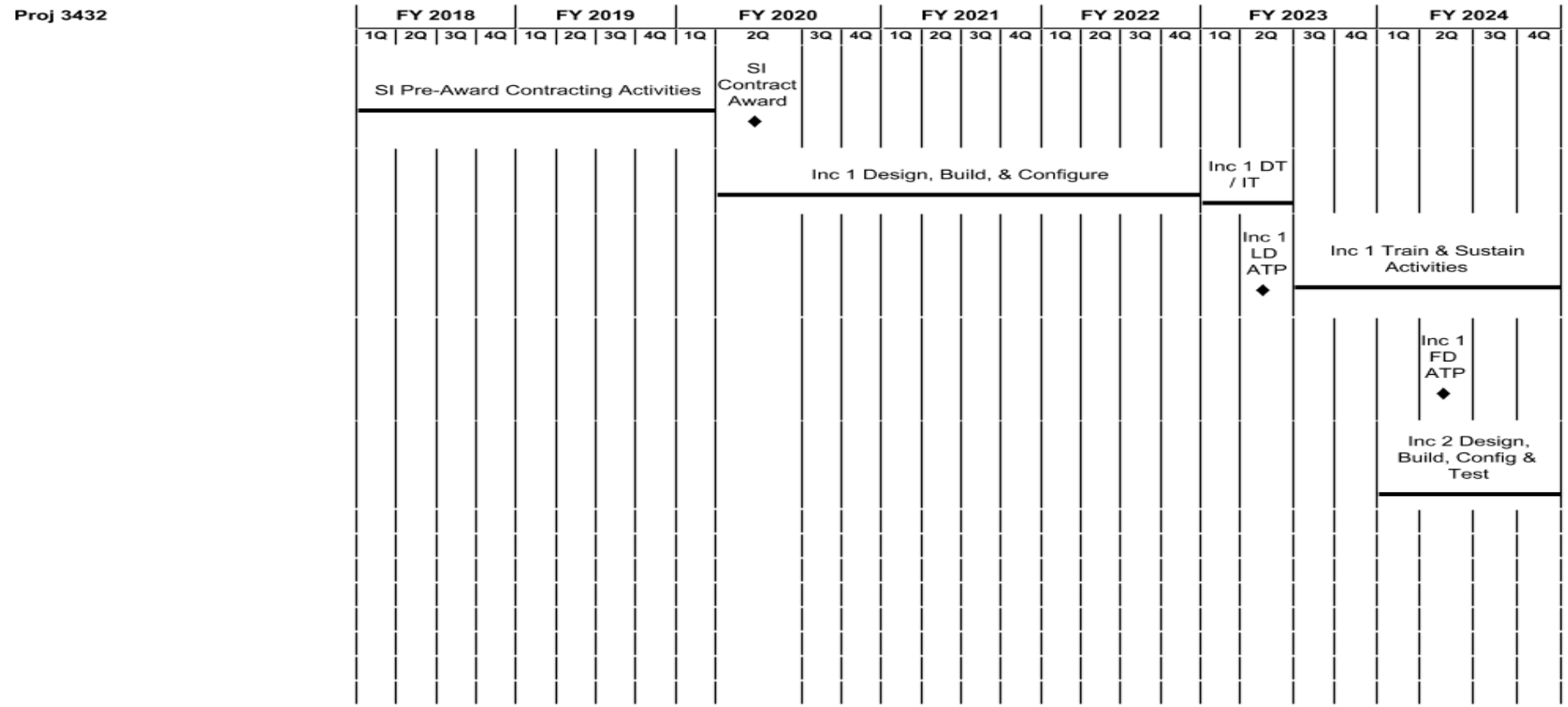
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3432 / *NMMES-TR* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

The increase from FY19 to FY20 coincides with the NMMES-TR program concluding pre-acquisition designation preparatory efforts and the award a single prime System Integrator (SI) contract and a MAC award for all commercial items including cloud hosting, integration environment layers, business applications, and other commercial items during FY20 Q2. The SI and the MAC vendors will begin the requirements and design review of the NMMES-TR solution to support a Critical Design Review scheduled for FY21 Q4. These activities will substantially increase the level of effort to design the system solution and conduct prototype demonstrations.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3432 / *NMMES-TR* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3432*** | | | | |
| Systems Integrator Pre-Award Contracting Activities | 1 | 2018 | 1 | 2020 |
| Systems Integrator Contract Award | 2 | 2020 | 2 | 2020 |
| Increment 1 - MRO & PPM Design, Build, & Configure | 2 | 2020 | 4 | 2022 |
| Increment 1 - MRO & PPM Developmental Test / Integrated Test | 1 | 2023 | 2 | 2023 |
| Increment 1 - MRO & PPM Limited Deployment ATP | 2 | 2023 | 2 | 2023 |
| Increment 1 - MRO & PPM Training & Sustainment | 3 | 2023 | 4 | 2024 |
| Increment 1 - MRO & PPM Full Deployment ATP | 2 | 2024 | 2 | 2024 |
| Increment 2 - SCM, ESOH & Data Analytics Build, Configure & Test | 1 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3784 / *Judge Advocate General (JAG) Enterprise System* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3784: *Judge Advocate General (JAG) Enterprise System* | 0.000 | 0.000 | 0.000 | 1.100 | - | 1.100 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.100 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

This project is a new Start in FY2020 for one-time cost to purchase and configure system for JAG.

**A. Mission Description and Budget Item Justification**

The Judge Advocate General (JAG) will migrate all current JAG Enterprise System (JES) modules to Microsoft Azure Services and Dynamics 365 as Software as a Service (SaaS) in a DoD-approved Commercial Cloud environment. JAG/Naval Legal Service Command (NLSC) currently has one hosted business system named the JAG Enterprise System (JES.) The JES hardware and virtual servers are hosted in the Navy Criminal Investigative Service (NCIS) data center on Quantico, VA. The hardware servers are at end of life and require replacement or virtualization, the software is outdated and requires upgrading, and NCIS requires that JAG seek another hosting platform outside of the NCIS datacenter by 2020. The office of the Judge Advocate General adjudicates a large volume of Claims, Reports and other pertinent Legal documentation which needs to be maintained and accessed quickly.

The JES replacement solution will modernize and automate six crucial functions of the JAG/NLSC organizations:

1. Tort Claims (including Admiralty)
2. Medical Claims
3. Personal & Property Claims
4. Investigations
5. JAG Recruiting and Accessions
6. Legal Assistance

Detailed module information and their function

1) The Claims and Investigations Module: The Claims and Tort Litigation Division (Code 15) has worldwide responsibility for processing different types of claims under various statutes and regulations. Code 15 utilizes JES to process approximately 45,000 claims each year, with claims paid and recovered totaling $60-$70 million. Code 15 is also the custodian and designated release authority for all command investigations convened pursuant to Chapter II of the Manual of the Judge Advocate General conducted prior to December 1995, and all litigation report investigations. These records are all stored in JES. Code 15 is not the custodian or release authority for command investigations convened after December 1995 nor investigations involving breaches of classified information or information security regulations maintained by the Chief of Naval Operations.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3784 / *Judge Advocate General (JAG) Enterprise System* |

2) The Recruiting and Accessions Module: Military Personnel (Code 61) utilizes JES to evaluate applicant qualifications for selection to participate in the Judge Advocate General Corps (JAGC); to evaluate applicant performance in the JAGC internship/externship program; to evaluate and improve the JAGC application and selection process; to conduct statistical analysis for internal management purposes; to manage the officers of the JAGC since the Judge Advocate General is statutorily required to make a recommendation on the assignment of all active-duty JAGC officers; to determine qualifications of an officer to receive a JAGC designation and to be certified as a trial or defense counsel; to determine the rotation dates and release from active-duty dates of JAGC officers, as well as the date new officers will be available for duty; to prepare JAGC strength plans for submission to the Office of the Chief of Naval Operations; and to obtain an officer's preference for duty assignment, as well as eligibility for consideration for postgraduate education and overseas assignments. Certain information is promulgated to all active-duty JAGC officers in an annual publication known as the Directory of Navy Judge Advocates. The information is promulgated in the directory for general informational purposes within the JAGC, including provision of position (billet) availability information to officers contemplating rotation.

3) The Legal Assistance Module: Formerly embedded in the Court Martial Tracking and Information System (CMTIS), this module enables Legal Assistance to track the time attorneys and support staff spend on the legal services they provide. It also provides Legal Assistance the ability to conduct client conflict checks before providing their services. The remaining data in CMTIS will be archived to provide historical data and is not part of the scope.

Microsoft Azure Services, Dynamics 365 and PowerBI as Software as a Service (SaaS) would be utilized to replace the functionality found in the JAG Enterprise System (JES) currently hosted in the NCIS Data Center on Quantico, VA. The migration of JES will eliminate the need to maintain the physical and virtual server environment that JES currently operates on. Dynamics 365's strong out-of-the-box case management capabilities and client management capabilities gives JAG an opportunity to modernize business processes. JAG estimates that Dynamics 365 and PowerBI will be able to support 85% of the requirements with out-of-the box functionality and configuration alone. Minimal customization should be required. Replacing JES with a Dynamics 365 and PowerBI based solution will not only improve JAG's operational efficiency, insights, and agility, but will also provide an integrated, agile, and highly secure platform for future military justice capabilities.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Judge Advocate General (JAG) Enterprise System | 0.000 | 0.000 | 1.100 | 0.000 | 1.100 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>New Start.<br><br>- JAG/NLSC plans to migrate to the Microsoft Cloud environment.<br><br>- JAG/NLSC plans to contract out the configuration changes with an authorized vendor in coordination with an authorized Cloud Service provider to migrate all existing JES modules, framed by the stakeholder requirements | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3784 / *Judge Advocate General (JAG) Enterprise System* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| information, to a new Software as a Service (SaaS) environment and all functionality currently in JES expanded and enhanced.<br>- JAG/NLSC plans to to prepare, document and implement all security controls necessary for Navy Risk Management Framework (RMF) certification based on the RMF utilizing in-house and contracted Cybersecurity services. Since many of the RMF controls can be inherited from the cloud vendor in the DoD environment, expect the support need in this realm to be significantly smaller than in our current on-premises hosting environment.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>New Start, one-time cost to purchase and configure system for the JAG. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 1.100 | 0.000 | 1.100 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Performance metrics will be based on the progress of agile development until completion of all activities listed in the Statement of Objectives (SOO). The data below lists the estimated time required to develop and deliver each module in the new cloud environment. The estimates are based on industry and vendor research based on our requirements. Each timeframe encompasses development, testing, and user acceptance. Development is driven in weekly sprints with weekly summary meetings held at the end of each week with the Contract Officer Representative (COR). Parallel development will be utilized when possible. The reporting of these metrics will be required in the SOO and will be measured by the COR.

Activity Name Estimated Duration
Tort Claims (including Admiralty) 9 Weeks
Medical Claims 7 Weeks
Personal & Property Claims 5 Weeks
Investigations 7 Weeks

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3784 / *Judge Advocate General (JAG) Enterprise System* |

Recruiting 7 Weeks
Legal Assistance 4 Weeks

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>3784 / *Judge Advocate General (JAG) Enterprise System* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | C/FFP | Microsoft : Washington, DC | 0.000 | 0.000 | | 0.000 | | 1.100 | Dec 2019 | - | | 1.100 | 0.000 | 1.100 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.100 | | - | | 1.100 | 0.000 | 1.100 | N/A |

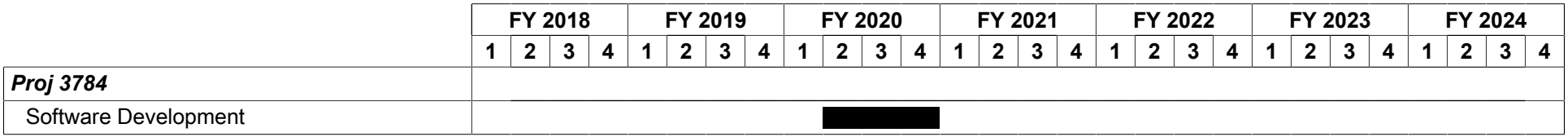
**Remarks**

Migration of existing data center system to Software as a Service (SaaS) in a Navy approved cloud environment.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 1.100 | | - | | 1.100 | 0.000 | 1.100 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3784 / *Judge Advocate General (JAG) Enterprise System* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>3784 / *Judge Advocate General (JAG) Enterprise System* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3784*** | | | | |
| Software Development | 2 | 2020 | 4 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>9406 / *Maintenance Data Warehouse* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9406: *Maintenance Data Warehouse* | 48.603 | 4.338 | 26.502 | 43.797 | - | 43.797 | 40.418 | 16.285 | 22.845 | 23.300 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Maintenance Data Warehouse funds the Naval Aviation Enterprise (NAE) Sustainment Vision (SV) 2020 digital transformation which is a critical component of improving readiness. It will be executed in a fully agile manner providing continuous fleet readiness improvements across the FYDP. The initial SV 2020 configuration will be supported with an agile Minimal Viable Product (MVP) as the foundation for continuous capability introduction. The Aviation Logistics Environment (ALE) will provide the seamless environment to support the integration of the other capabilities developed in Maintenance Data Warehouse.

Aviation Data Warehouse/Decision Knowledge Programming for Logistics Analysis and Technical Evaluation (DECKPLATE) program is the next generation data warehouse containing over 30 years of aircraft maintenance, flight, components, and usage data. Through the use of web-based, commercial off the shelf software for data load, analysis, query, and reporting tools, the user has the capabilities to effectively obtain readiness data in a near real-time environment, as well as providing historical data for long range planning, trend and records analysis, records reconstruction, and compliance with technical directives. DECKPLATE supports the mission of the warfighter who requires a single source of near real-time aviation data in which to base critical readiness decisions. DECKPLATE collects data from authoritative sources, such as the fleet maintenance systems, into a data warehouse. Because the warfighter only needs to access one database, the time consuming task of collecting various pieces of data from various sources will be reduced and ultimately eliminated. This also accomplishes a reduction in legacy systems mandated by Office of the Chief of Naval Operations. DECKPLATE manages total inventory for two major categories of assets, Aircraft (General Equipment) and Engine/Propulsion Systems/Modules (EPSMs) (Operating Materials & Supply). DECKPLATE is comprised of the transactional Aircraft Inventory and Readiness Reporting (DECK-AIRRS) and the Engine Transaction Reporting (DECK-ETR) subsystems which provide the complete lifecycle for aircraft and Engine/ Propulsion System/Modules (EPSMs). DECKPLATE has been identified as a level 1 financial feeder system due to the value of the aircraft and EPSM's managed in the system, and continues to respond to audit compliance and Cyber Security mandates. DECKPLATE is a core feeder system to numerous NAVAIR efforts.

Condition Based Maintenance Plus (CBM+) solution is an initiative which provides Naval Aviation Enterprise with common enabling capabilities which deliver timely data-driven, decisional information to optimize aircraft availability and materiel readiness by incorporating health and usage leading indicators into the failure mode mitigation process, enabling the Warfighter to more efficiently meet mission requirements through automated analysis and decision making processes. The CBM+ initiative increases readiness through streamlined maintenance processes which provide the sustainment base with timely, actionable logistics/engineering data and integrated analytics not previously available, enabling engineers and acquisition professionals to support system improvements based on CBM+ acquired data and analytic results. CBM+ provides the enabling infrastructure and storage solutions within an Enterprise common environment needed to store and analyze weapon system sensor data to extend the life of current and new acquisition aircraft, realizing savings from reductions in field (organizational and intermediate) maintenance actions, reduced functional check flight hours, mishap mitigation, and reduced parts usage.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

The Aviation Logistics Environment (ALE) program is the Naval Aviation Information Technology (IT) solution to deliver full lifecycle weapon system logistics and maintenance capabilities to the functional Naval Aviation Support Process (NASP). ALE will provide a seamless digital environment that will improve readiness and provide for reduced system development, testing, deployment, and sustainment costs, as well as reduced cyber risk due to lower number of IT systems and ability to address capability gaps via an integrated technology schedule. It will deliver these capabilities via a net centric, shared data environment that supports shore based, afloat, and expeditionary operations. The ALE integrates IT services plane-side and interfaces with infrastructure systems where necessary. ALE is a global logistics enterprise solution and a part of the total enterprise solution architecture. ALE is designed to structure IT services with the ability to connect with other parts of the enterprise solution set, thus enabling an interoperable end-to-end business process. ALE consolidates Naval Aviation data into an integrated data environment for high level analysis. ALE will integrate, organize, and develop an underlying infrastructure and analytical capacity across the NASP in order to generate a holistic timely picture of readiness and condition for all T/M/S. ALE will be providing modern Product Lifecycle Management (PLM), Decision Support (Predictive Analytics), Planeside Interfacing, and the Enterprise Infrastructure to support the NAE. The ALE program is a "system of systems" that will provide a common, integrated data environment that will enable NAE Vision 2020 data transparency across the Naval Aviation Enterprise; end-to-end process view to enable both consuming and providing on-demand information to stakeholders; a capability to view "digital twins" of all T/M/S for both allowable and as- configured states; a consolidation of aging, near-end-of-life systems and applications to modern technology and cost efficient support infrastructures; consistent and accurate weapons systems technical and Computer Aided Design (CAD) engineering documentation to support additive manufacturing capabilities; standardized metrics, algorithms, and business analysis tools; an architecture that enables migration to the cloud; and alignment to Information Assurance (IA) and Cybersecurity standards, and Risk Management Framework (RMF) compliance.

Vector (formally Integrated Logistics Management System (ILSMS)) supports the development of a common logistics analytical application which uses a disciplined approach to Business Intelligence (BI) architecture by combining products, data, technology and methods aimed at key Naval Aviation Enterprise (NAE) business processes. Vector provides a single view of the data to focus on aircraft readiness, maintenance, supply, cost, and man-hours. Vector provides naval aviation with a common view of approved key performance metrics and the capability to perform multi-system analysis of Ready for Tasking (RFT)/Ready Basic Aircraft (RBA) Gap drivers, 'Top-Down' aircraft systems analysis down to the component level. Vector identifies system performance trends early to mitigate future readiness and cost impacts to the fleet.

Dynamic Scheduling optimizes aircraft (BuNo specific), engine and component maintenance through task sequencing based on reliability and failure data, and asset utilization vice calendar directed maintenance. Dynamic Scheduling will have insight to demand across the NAE and can affect maintenance across all levels of maintenance. Dynamic Scheduling IT system capability will interface with authoritative source systems providing and consuming operational demand, man power, training, supply and others. Near term Dynamic Scheduling capability is planned for NALCOMIS OOMA and future state DS capability is planned for NAMS implementation. Both material and non-material changes implemented along with the DS IT system will provide capability that overcomes the challenges faced by the as-is state to include:

.Advanced scheduling capabilities interfaced with current future MRO system to enable system assisted scheduling, optimization and opportunistic maintenance.
.Insight and the ability to collaborate and affect schedules across all levels of maintenance and MRO systems.
.Capture and analysis of RCM mitigations strategies with the ability to quickly implement changes to maintenance tasks and periodicities.
.The ability to package Technical Manuals for serial number specific, scheduled event tasks at the point of maintenance.
.The ability to provide additional point of maintenance technical data and support to enable the maintainer of the future.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

Optimized Scheduled Maintenance and Dynamic Scheduling IT system capabilities will contribute to the reduction of MMHs and increase in operational availability objectives by positively affecting the efficiency of maintenance at the O, I & D-Levels of maintenance across the NAE. Future state OSM IT system capability may be provided by the Aviation Logistics Environment (ALE)/Product Lifecycle Management (PLM) solutions. Dynamic Scheduling IT capability is schedule to be developed as an interface to NALCOMIS OOMA . Future state version of Dynamic Scheduling IT capability will interoperate with Naval Aviation Maintenance System (NAMS) and other future state system such as Naval Data Repository (NDR), ALE/PLM, and Navy Depot Management System (NDMS).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Aviation Data Warehouse/Decision Knowledge Programming for Logistics Analysis and Technical Evaluation (DECKPLATE) | 1.537 | 1.971 | 4.190 | 0.000 | 4.190 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Develop additional financial management requirements for the DECKPLATE financial feeder systems, Engine Management and Aircraft Inventory Readiness and Reporting System (AIRRS), required as a result of ongoing audit assessments. Data aggregation capabilities and data source integration will be developed between DECKPLATE and Vector to streamline data timeliness for NAE Business Intelligence and Data Analytics. These capabilities will improve the Naval Aviation Enterprise's ability to perform readiness analysis. Development will continue for the DECKPLATE Auto-Log set Phase II capabilities, which has the objective of providing improved algorithms, reduced data duplication, and extension of the life limits for aircraft components. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue development of additional financial management requirements for the DECKPLATE financial feeder subsystems, Engine Management and Aircraft Inventory Readiness and Reporting System (AIRRS), required as a result of ongoing audits; development of anticipated use cases for blockchain technologies to enable improved audit compliance for multiple transactional equipment inventory and other feeder systems. Continue development and enhancements as a result of Naval Aviation Maintenance Program policy changes and emerging fleet requirements. Develop and integrate Joint Strike Fighter Automated Logistics Information System (ALIS) data into the aviation data warehouse. Data mapping, integration, and implementation plans will begin for the Naval Aviation Maintenance System (NAMS), the replacement for legacy Naval Aviation Logistics Command Management Information Systems (NALCOMIS). Modernize existing software to be maintained as part of the future enterprise suite of data warehousing and analytics tools. Integration and capability enablement will continue with other key NAVAIR Defense Business Systems and initiatives, including Joint Technical Data Integration (JTDI), Configuration Management System (CMS), Joint Engineering Data Management | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Information & Control System (JEDMICS), Aviation Logistics Environment (ALE), Dynamic Scheduling in support of NAVAIR's Digital Transformation and Vision 2020 Initiatives<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $2.219M increase will include solidifying data warehousing requirements for the and begin analytic initiatives as required for Vision 2020. DECKPLATE will begin development of the base Naval Data Repository capabilities which need to be developed in order to support these programs. Data mapping, integration, and implementation plans will begin for the Naval Aviation Maintenance System (NAMS). | | | | | |
| ***Title:*** Aviation Logistics Environment (ALE)<br>***Articles:***<br><br>***FY 2019 Plans:***<br>The program was provided FY 2018 funding for Vision 2020 in support of Aviation Logistics Environment (ALE) in order to meet the FY 2019 demands. The ALE program was able to accomplish document preparation, acquisition strategy for contracting, and initial base lining of the requirements documents. Initiation of the common ground station prototype for various T/M/S commenced along with the Product Lifecycle Management (PLM) for ALE modernization as the solution set to support the NAE and additive manufacturing in FY19. FY19 efforts will be solidifying requirements, development of documentation to support the Naval Aviation Enterprise (NAE) and Vision 2020, and prototyping the base capabilities to support the Vision 2020 program schedule. The Aviation Logistics Environment (ALE) program will start modernizing existing software that will be maintained as part of the enterprise set of tools. ALE will be supporting the Digital Warfare Office (DWO) readiness initiatives by beginning the development of necessary IT tools, processes, and a common ground station. ALE will begin the development of an integrated data environment, and the determination of a Product Lifecycle Management solution set to support the NAE and additive manufacturing.<br><br>***FY 2020 Base Plans:***<br>The ALE program will continue to modernize existing software by developing automated workflows, integrating aviation platform content, and initiating legacy system transitions into the NAVAIR Product Lifecycle Management (PLM) solution for NAVAIR IT products. ALE has 35 systems that will be transitioned into the | 0.000<br>- | 20.500<br>- | 32.985<br>- | 0.000<br>- | 32.985<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| aviation PLM solution and will continue to build the Enterprise Service Bus (ESB) connectors, continue user acceptance testing of the common ground station and determine requirements for the use by other T/M/S.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $12.485M ALE increase due to developing automated workflows, integrating aviation platform content, and initiating legacy system transitions into the NAVAIR Product Lifecycle Management (PLM) solution , and continuing to build Enterprise Service Bus (ESB) connectors. | | | | | |
| ***Title:*** Dynamic Scheduling | 0.000 | 0.000 | 3.238 | 0.000 | 3.238 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Build the initial configuration of Dynamic Scheduling to support SV 2020. Begin working on the task decomposition baseline required for platform integration.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $3.238M increase is to build the initial configuration of Dynamic Scheduling capability and begin the complex task decomposition required for platform integration. | | | | | |
| ***Title:*** Condition Based Maintenance Plus (CBM+) | 2.801 | 4.031 | 1.048 | 0.000 | 1.048 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue expansion of CBM+ Standard Data Repository (based on the Hadoop Distributed File System) in production to accommodate and make accessible all BIT/Parametric/Mechanical/Diagnostics data across all NAVAIR smart weapon system platforms, and continue evolving advanced analytic and Business Intelligence tools within the Enterprise Common CBM+ Environment (Ozone Widget Framework). Integration and enhancement efforts include scaling and widget enablement of Data Miner, Active Reporting Client (ARC), Mechanical Diagnostics Analysis Tool Navy (MDAN), and Regime Recognition analytic tools with the common | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| storage and analytics environment. Integration of the environment's best of breed analytical tools will continue per the annual CBM+ Engineering Analysis Tool consolidation and reuse plan, including the migration of Regime Recognition from Oracle to Hadoop, further enabling the large scale storage and analytics environment. Further enable NAVAIRs Core Data Science IPT with massively large scale advanced Statistical Analysis capabilities (COTS and GOTS), standing up MatLab, Python, R, and Anaconda for integrated advanced analytics sandbox capability for rapid algorithm development, testing and fielding, while enabling select Organizational Level Maintenance activities at New River with a wireless infrastructure foundation tier using standard applications for configuration management and smart aircraft data movement, enabling integrated technologies in support of plane side maintenance and sensor data collection and movement to improve the on-weapon system maintenance process.<br>***FY 2020 Base Plans:***<br>Integrate and transition CBM+ Standard Data Repository (SDR) and Analytic Tool Suite with Naval Aviation Data Warehouse (DECKPLATE) and Joint Technical Data Integration (JTDI) Defense Business Systems in test and production environments making all weapon system and supporting maintenance data remotely accessible and transportable across the Enterprise within a comprehensive Integrated Data Environment. Further enablement of best of breed Business Intelligence and Advanced Analytic tools within the Enterprise Common CBM+ Environment (Ozone Widget Framework) will continue at the Enterprise Level, while enabling comparable capabilities at edge locations ashore and afloat using NAVAIR Fleet System Array (NFSA) infrastructure and analytics hosting environment. GOTS / COTS / Open source integration and enhancement efforts will continue for established widgets (Data Miner, Active Reporting Client (ARC), Mechanical Diagnostics Analysis Tool Navy (MDAN), and Regime Recognition, Zoom Data, Anaconda (Python / R), Zeppelin, and other analytic tools) within the common storage and analytics environment. Enhancements to the environment's best of breed analytical tools and will continue with focus on serial number tracking and supporting transactional system reconciliation by integrating Configuration Management System (CMS) capabilities with the CBM+ enabled data platform and integrated analytics within the common data and analytics environment. Complete appropriate migrations of CBM+ applications to containerized architecture to improve scalability of analytic sandbox environments supporting Engineering and Data Science community use cases to access data and integrated analytics at scale.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The $2.983M decrease reduces the Development efforts for the Future Readiness Cross-Functional Team (FR-CFT) CBM+ Initiative established IT products, including the Standard Data Repository (SDR) and Analytic Tool Suite will be transitioned to the Joint Technical Data Integration (JTDI) and Naval Aviation Data Warehouse (DECKPLATE), and Configuration Management System (CMS) Defense Business Systems in test and production environments for continued enhancements to maintain timely and remote access to all weapon system and supporting maintenance data, while enabling bidirectional transport capabilities from the warfighting edge across the Enterprise within a comprehensive Integrated Data Environment. | | | | | |
| ***Title:*** Vector | 0.000 | 0.000 | 2.336 | 0.000 | 2.336 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>Continued development of additional Vector capabilities to satisfy requirements of Naval Aviation Enterprise customers to include: Implementing Business Intelligence (BI) software capabilities selected as part of Analysis of Alternatives performed in FY19; complete NAVSUP Predictive Supply Digital Interface development and implementation; Continued development of Engine and Engine Components Readiness Module Phase Two; Consolidation and Integration of Aircraft Status Dashboard and Daily Maintenance Status into Vector; compliance with emerging Cyber Security policies; consolidation and automation of data sources between Decision Knowledge Programming for Logistics and Technical Evaluation (DECKPLATE), Naval Business Information System (NBIS), Defense Logistics Agency (DLA), and Navy Visibility and Management of Operating and Support Cost (VAMOSC) to support improved data accuracy, integrity, and availability; begin analysis and data mapping efforts for integration of the Naval Aviation Maintenance System (NAMS) data elements received through the DECKPLATE data feed into Vector. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The $2.336M increase will perform development of Vector analytics requirements for Vision 2020 initiatives and integration of Vector and best of breed CBM+ analytics into DECKPLATE, transitioning from current .net architecture to commercial Business Intelligence tools to support the future analytics platform and Enterprise Integrated Data Environment. DECKPLATE will be Integrated with the Joint Technical Data Integration (JTDI) Standard Data Repository (SDR) Data Platform providing seamless access and at scale analysis to all Naval | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Aviation weapon and IT system sensor, logs and maintenance related data. Begin the analysis of data mapping and new requirements of the Naval Aviation Maintenance System (NAMS). | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.338 | 26.502 | 43.797 | 0.000 | 43.797 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/4268/DECKPLATE: *Other Aviation Support Equipment* | 1.870 | 2.049 | 2.221 | - | 2.221 | 2.253 | 2.289 | 2.346 | 2.394 | Continuing | Continuing |
| • OPN/4268/CBM: *Other Aviation Support Equipment* | 0.199 | 0.216 | 0.286 | - | 0.286 | 0.291 | 0.298 | 0.303 | 0.309 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Aviation Data Warehouse/Decision Knowledge Programming for Logistics Analysis and Technical Evaluation (DECKPLATE) - Development services will be performed under a competitively awarded contract. The task order contains a matrix of tasks and required levels of performance. Follow on contracts will utilize the same competitive system. The services provided under the contract support acquisition will not encompass tasks inherently Governmental in nature. The Statement of Work includes a matrix that establishes the minimum acceptable performance standards.

Condition Based Maintenance Plus (CBM+) - Development will be provided using competitively awarded contracts coordinated via NAVAIR's Aviation Logistics Environment (ALE) Program Management and supporting Contract Business Office, and will contain a matrix of tasks and required levels of performance. Follow on Contracts will utilize the same competitive system. The Services provided under the contract support acquisition will not encompass tasks inherently Governmental in nature, and Statements of Work will include a matrix that establishes the minimum acceptable performance standards.

Aviation Logistics Environment (ALE)- Development services will be awarded using a competitively awarded contract that will contain a matrix of tasks and required levels of performance. Follow on contracts will also follow the same competitive system. The Services provided under the contract support acquisitions will not encompass tasks inherently Governmental in nature and the Statements of Work will include a matrix that establishes the minimum acceptable performance standards.

Vector Software - Software development will be performed under a competitively awarded Cyber Security (CS) Contract. Follow on Contracts will utilize the same competitive system. The Services provided under the contract support acquisitions will not encompass tasks inherently governmental in nature. The Statements of Work will include a matrix that establishes the minimum acceptable performance standards.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

Dynamic Scheduling - Development services will be awarded using a competitively awarded contract under the Seaport Contract System containing a matrix of tasks and required levels of performance. Follow on Contract will utilize the same competitive system. The Services provided under the contract support acquisition.

**E. Performance Metrics**

The following performance metrics apply to Aviation Data Warehouse/
Decision Knowledge Programming for Logistics Analysis and Technical Evaluation (DECKPLATE), Condition Based Maintenance (CBM+), Vector, Aviation Logistics Environment (ALE) and Dynamic Scheduling:

1. Metric - During the life of the contract verify conformance with agency specific information processing standards and functional requirements. Prior to delivery of enhanced software, demonstrate the operational capability of the system software. Standard - Functionality of the software to meet required systems architecture and processing capabilities. Max Deviation Allowed - All requirements mandated by law or regulation must be 100% compliant. Quality Assurance - Independent Verification and Validation (IV&V) for testing new releases of software to determine that previous functionality is maintained. Customer satisfaction as measured through limited validated customer complaints, feedback, and surveys.
2. Metric - Interfaces must maintain compatibility among system components in the operational environment. Standard - Service Levels for software: Throughput in terms of processing response time, number of transactions processed per second; volume of data processed over time. Compatibility with particular hardware and software within the existing processing environment. Functionality of software to meet required systems architecture and processing capabilities. Max Deviation Allowed - None. Quality Assurance - Customer satisfaction as measured through limited validated customer complaints, feedback and surveys. Operational monitoring by use of system statistics and logs. IV&V for testing new software, including verifying results to determine that requirements and specifications are met.
3. Metric - Documentation for deliverables must match the agency specific system processing and operational procedures. Standard - Documentation meets agency specific formats for accuracy and completeness. Max Deviation Allowed - None. Quality Assurance - IV&V for determining that documentation delivered by the contractor matches the system processing and operational procedures.
4. Metric - Meet delivery dates/milestones. Period of Performance will be 12 months from the date of award. Standard - Delivery dates are met, or exceeded. Max Deviation Allowed - None. Quality Assurance - 100% inspection.
5. Metric - Security. Standard - Meet all Government and agency specific requirements. Max Deviation Allowed - None. Quality Assurance - 100% inspection to ensure that all Government and Agency specific requirements have been met. Independent verification of security procedures defined by agency (could be performed by a third party, or another agency according to current security regulations and measures).
6. Metric - Enhancement to software shall not adversely affect system performance. Standard - Standards affecting system performance include but are not limited to: response time for resolving problems; central processing unit busy; response time; memory utilization; storage utilization. Max Deviation Allowed - Base line functionality is met at 100%. Non critical functionality is met at 95%. Quality Assurance - Operational monitoring by use of system statistics and logs.
7. Metric - New releases of software must maintain previously provided functionality, while providing enhanced capabilities, or systems corrections. Standard - Software adds value and improves existing functionality without negatively impacting the existing operational environment. Max Deviation Allowed - Base line functionality is met at 100%. Non critical functionality is met at 95%. Quality Assurance - Independent Verification and Validation for testing new releases of software to determine that previous functionality is improved. Customer satisfaction is measured through validated customer complaints and surveys.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year Prod Def no longer funded in the FYDP | Various | Various : Various | 16.255 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Software Development for Aviation Logistics Environment (ALE) | Various | Various : Various | 0.000 | 0.000 | | 17.800 | Jul 2019 | 29.405 | Feb 2020 | - | | 29.405 | Continuing | Continuing | Continuing |
| Software Development for Decision Knowledge Programming for Logistics Analysis and Technical Evalutaion (DECKPLATE) | C/CPFF | Spalding : Lexington Park, MD | 5.670 | 0.547 | Nov 2017 | 0.882 | Nov 2018 | 3.054 | Dec 2019 | - | | 3.054 | Continuing | Continuing | Continuing |
| Softare Development for Condition Based Maintenance Plus (CBM+) | C/CPFF | KRB Wyle : Patuxent River, MD | 17.172 | 2.532 | Nov 2017 | 3.511 | Nov 2018 | 0.880 | Dec 2019 | - | | 0.880 | Continuing | Continuing | Continuing |
| Software Development for Vector | C/CPFF | KRB Wyle : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 2.026 | Dec 2019 | - | | 2.026 | Continuing | Continuing | Continuing |
| Software Development for Vector | C/CPFF | Spalding : Lexington Park, MD | 0.000 | 0.000 | | 0.000 | | 0.125 | Dec 2019 | - | | 0.125 | 0.000 | 0.125 | 0.125 |
| Software development for Dynamic Scheduling | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 3.040 | Jan 2020 | - | | 3.040 | Continuing | Continuing | Continuing |
| Software Development for Decision Knowledge Programming for Logistics Analysis and Technical Evalutaion (DECKPLATE) | C/CPFF | KRB Wyle : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.838 | Dec 2019 | - | | 0.838 | 0.000 | 0.838 | 0.838 |
| Software Development for Aviation Logistics Environment (ALE) | C/CPFF | KRB Wyle : Patuxent River, MD | 0.593 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.593 | 0.593 |
| | | **Subtotal** | 39.690 | 3.079 | | 22.193 | | 39.368 | | - | | 39.368 | Continuing | Continuing | N/A |

**Remarks**

(1) The ALE program will continue to modernize existing software by developing automated workflows, integrating aviation platform content, and initiating legacy system transitions into the NAVAIR Product Lifecycle Management (PLM) solution for NAVAIR IT products. ALE has 35 systems that will be transitioned into the aviation PLM solution and will continue to build the Enterprise Service Bus (ESB) connectors, continue user acceptance testing of the common ground station and determine requirements for the use by other T/M/S.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>9406 / *Maintenance Data Warehouse* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) DECKPLATE increase will support the development of the base Naval Data Repository capabilities which need to be developed in order to support these programs. Data mapping, integration, and implementation plans will begin for the Naval Aviation Maintenance System (NAMS).<br>(3) VECTOR increase will support the development of Vector analytics requirements for Vision 2020 initiatives and integration of Vector and best of breed CBM+ analytics into DECKPLATE, transitioning from current .net architecture to commercial Business Intelligence tools to support the future analytics platform and Enterprise Integrated Data Environment. | | | | | | | | | | | | | | | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support for DECKPLATE | WR | NAWCAD : Patuxent River, MD | 6.126 | 0.899 | Oct 2017 | 1.089 | Oct 2018 | 0.298 | Oct 2019 | - | | 0.298 | Continuing | Continuing | Continuing |
| Prior year Prod Def no longer funded in the FYDP | Various | Various : Various | 0.628 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Program Management Support for CBM+ | WR | NAWCAD : Patuxent River, MD | 2.159 | 0.360 | Oct 2017 | 0.520 | Oct 2018 | 0.168 | Oct 2019 | - | | 0.168 | Continuing | Continuing | Continuing |
| Program Management Support for Aviation Logistics Environment (ALE) | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 2.700 | Oct 2018 | 3.580 | Oct 2019 | - | | 3.580 | Continuing | Continuing | Continuing |
| Program Management Support for Vector | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.092 | Oct 2019 | - | | 0.092 | Continuing | Continuing | Continuing |
| Program Management Support for Vector | C/CPFF | KRB Wyle : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.093 | Dec 2019 | - | | 0.093 | 0.000 | 0.093 | 0.093 |
| Program Management Support for Dynamic Scheduling | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.198 | Oct 2019 | - | | 0.198 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 8.913 | 1.259 | | 4.309 | | 4.429 | | - | | 4.429 | Continuing | Continuing | N/A |

**Remarks**

(1) The ALE program will continue to modernize existing software by developing automated workflows, integrating aviation platform content, and initiating legacy system transitions into the NAVAIR Product Lifecycle Management (PLM) solution for NAVAIR IT products. ALE has 35 systems that will be transitioned into the aviation PLM solution and will continue to build the Enterprise Service Bus (ESB) connectors, continue user acceptance testing of the common ground station and determine requirements for the use by other T/M/S.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

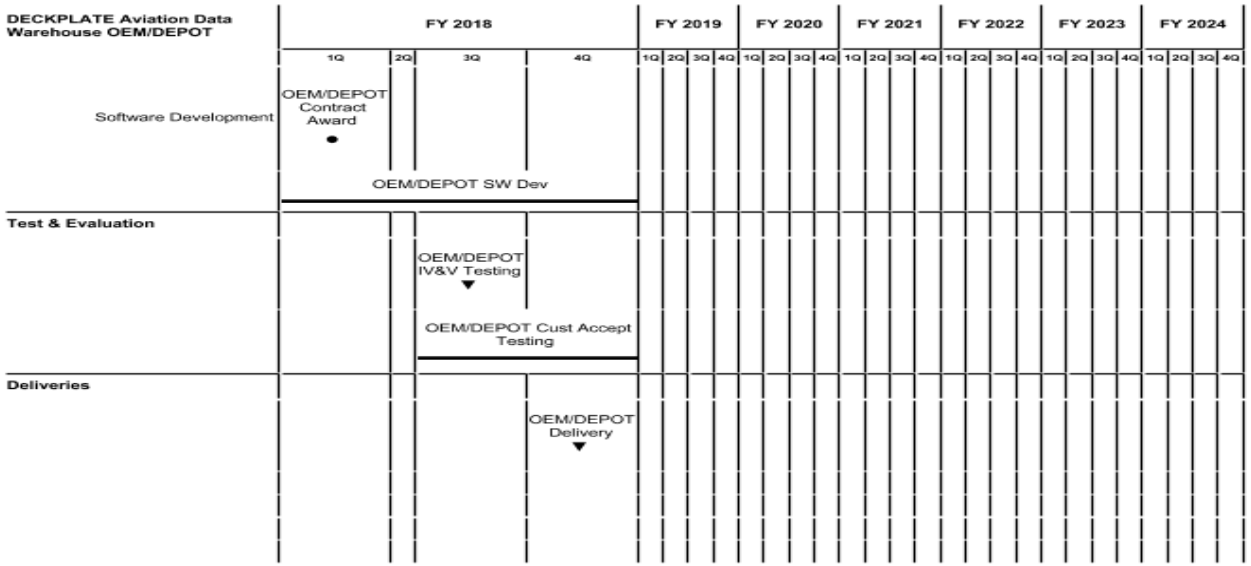
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (2) DECKPLATE increase will support the development of the base Naval Data Repository capabilities which need to be developed in order to support these programs. Data mapping, integration, and implementation plans will begin for the Naval Aviation Maintenance System (NAMS).<br>(3) VECTOR increase will support the development of Vector analytics requirements for Vision 2020 initiatives and integration of Vector and best of breed CBM+ analytics into DECKPLATE, transitioning from current .net architecture to commercial Business Intelligence tools to support the future analytics platform and Enterprise Integrated Data Environment. | | | | | | | | | | | | | | | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 48.603 | 4.338 | | 26.502 | | 43.797 | | - | | 43.797 | Continuing | Continuing | N/A |

**Remarks**

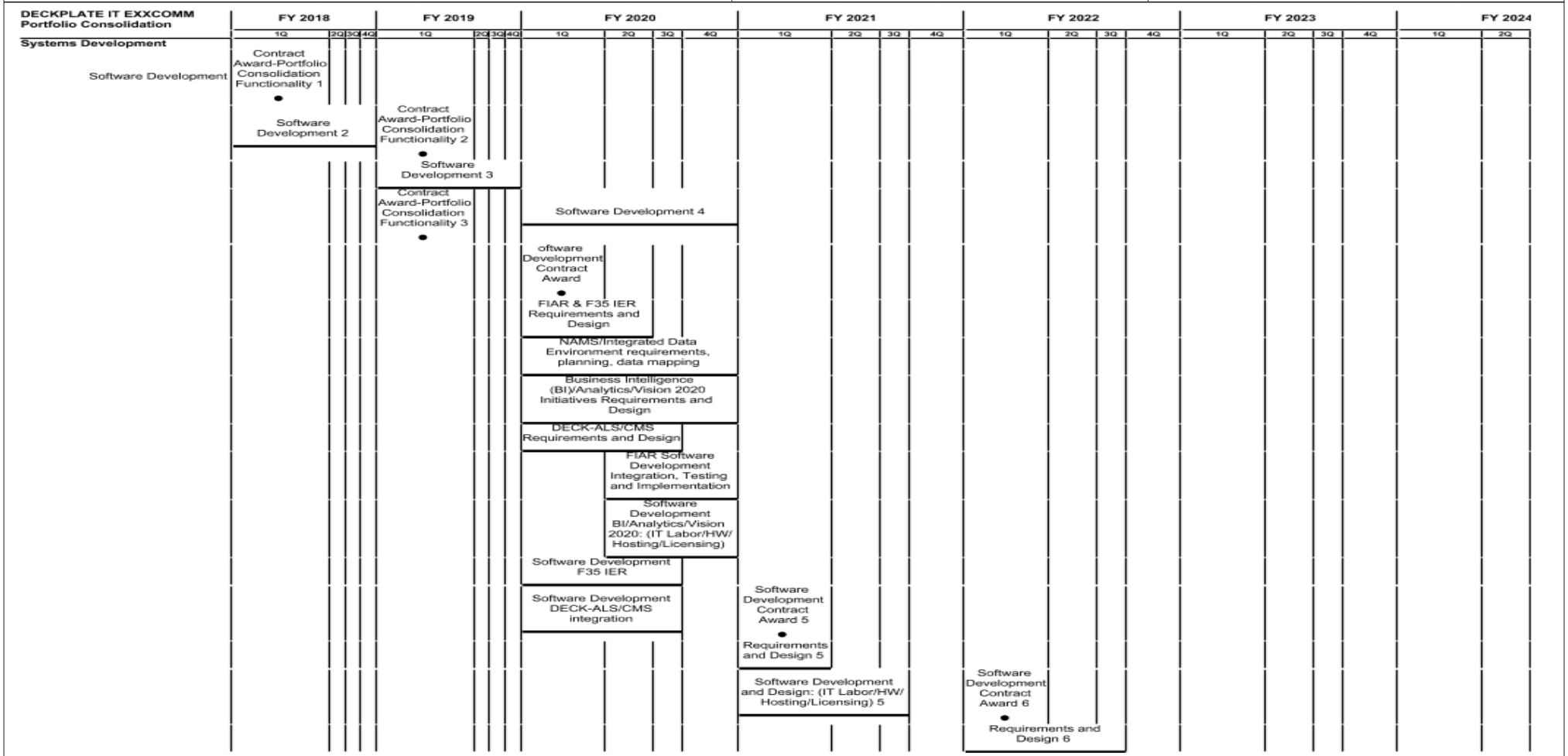
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |



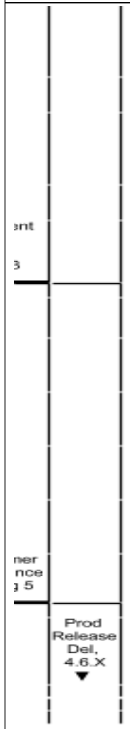

2020PB - 0605013N - 9406

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

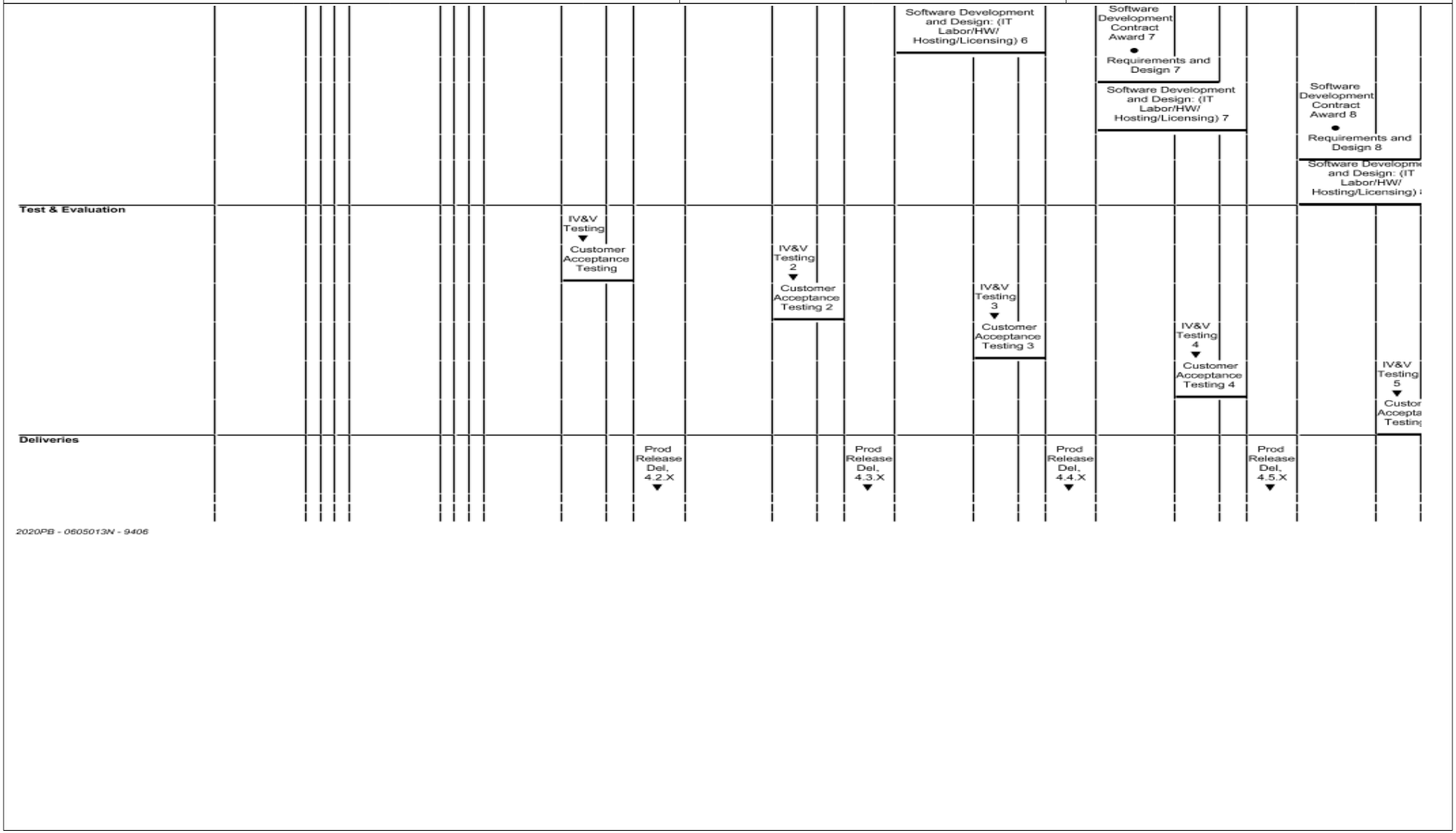
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |



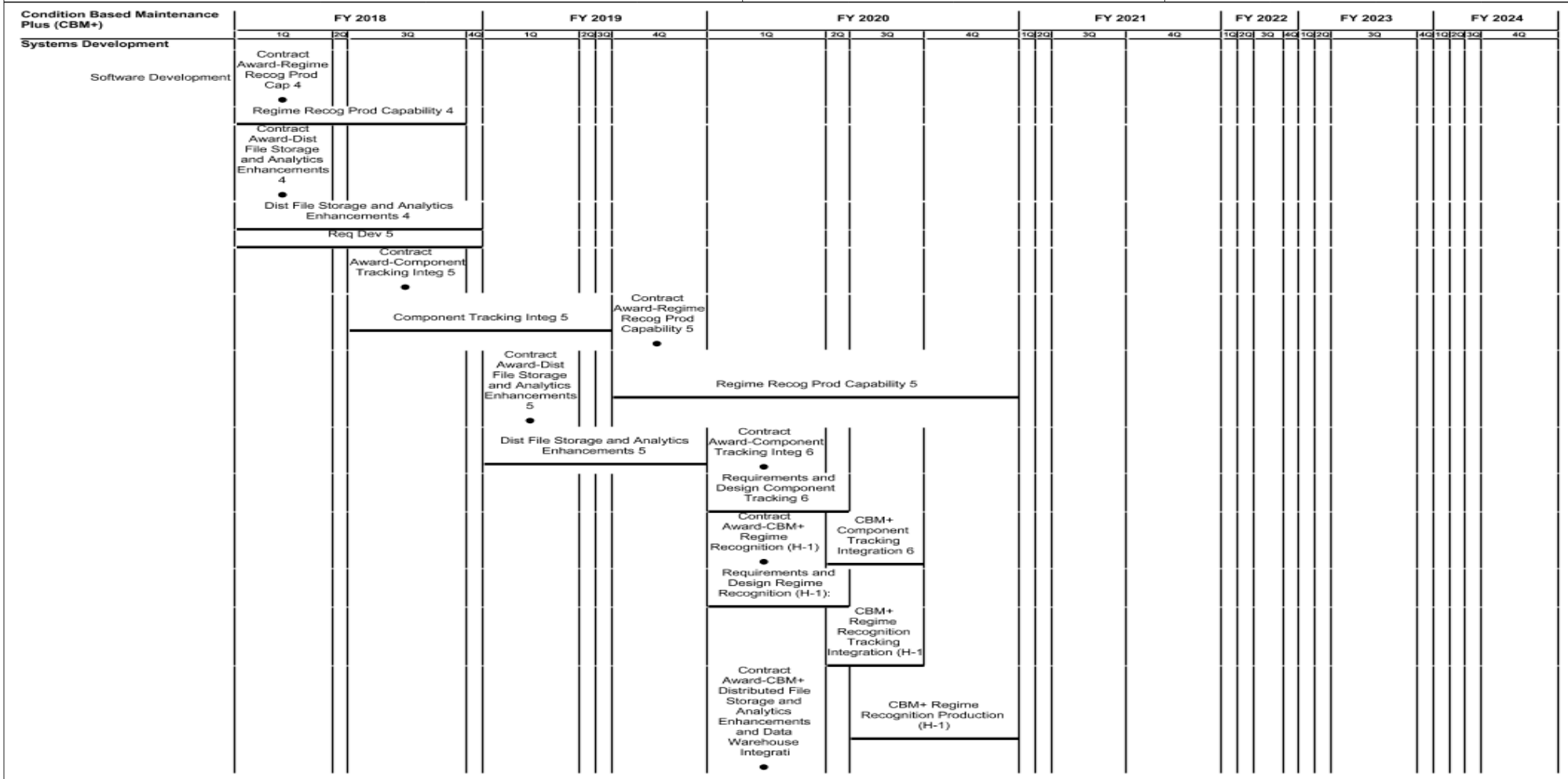
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |



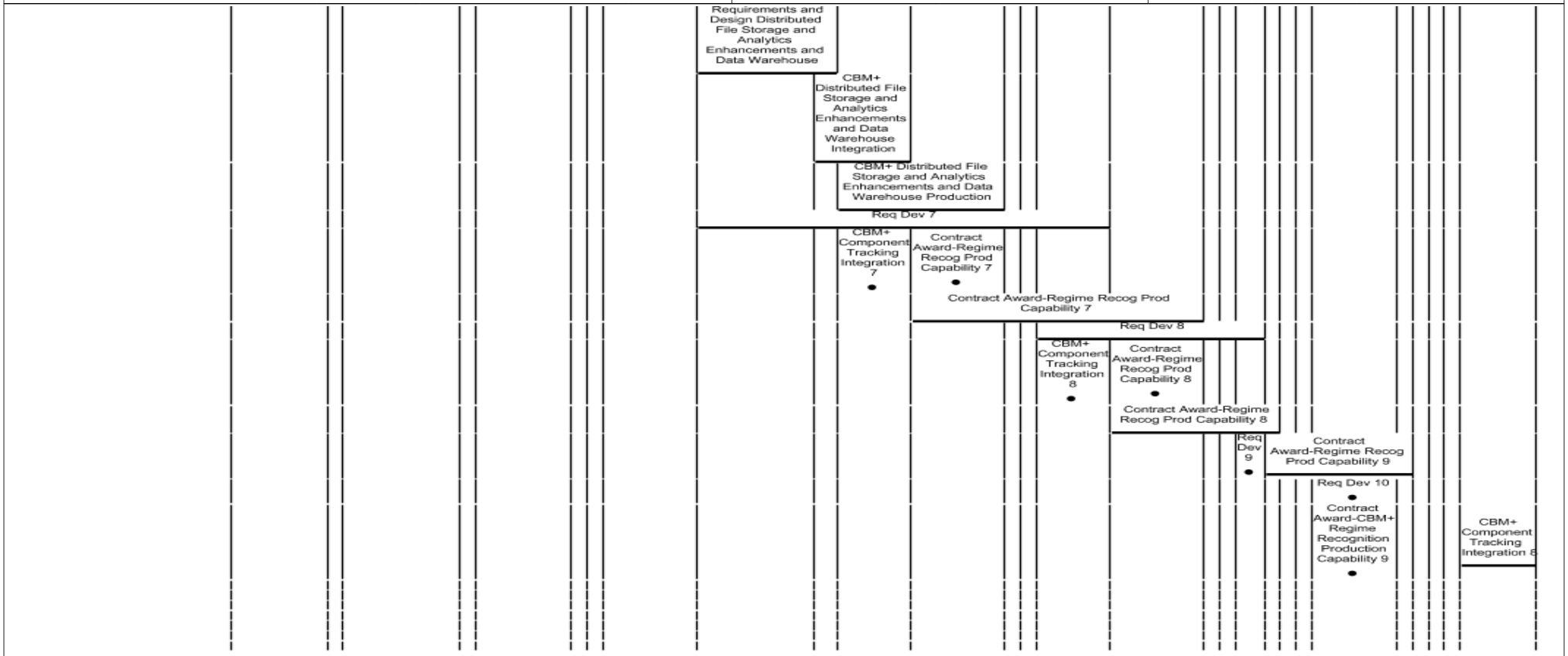
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |



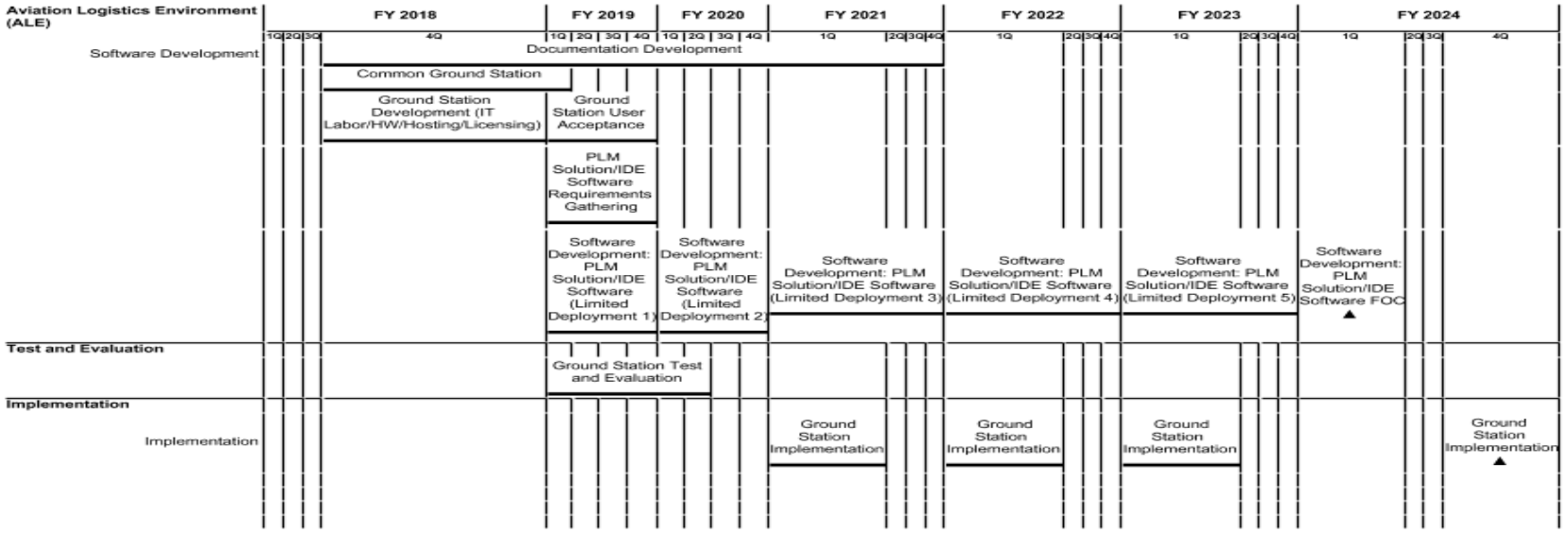
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

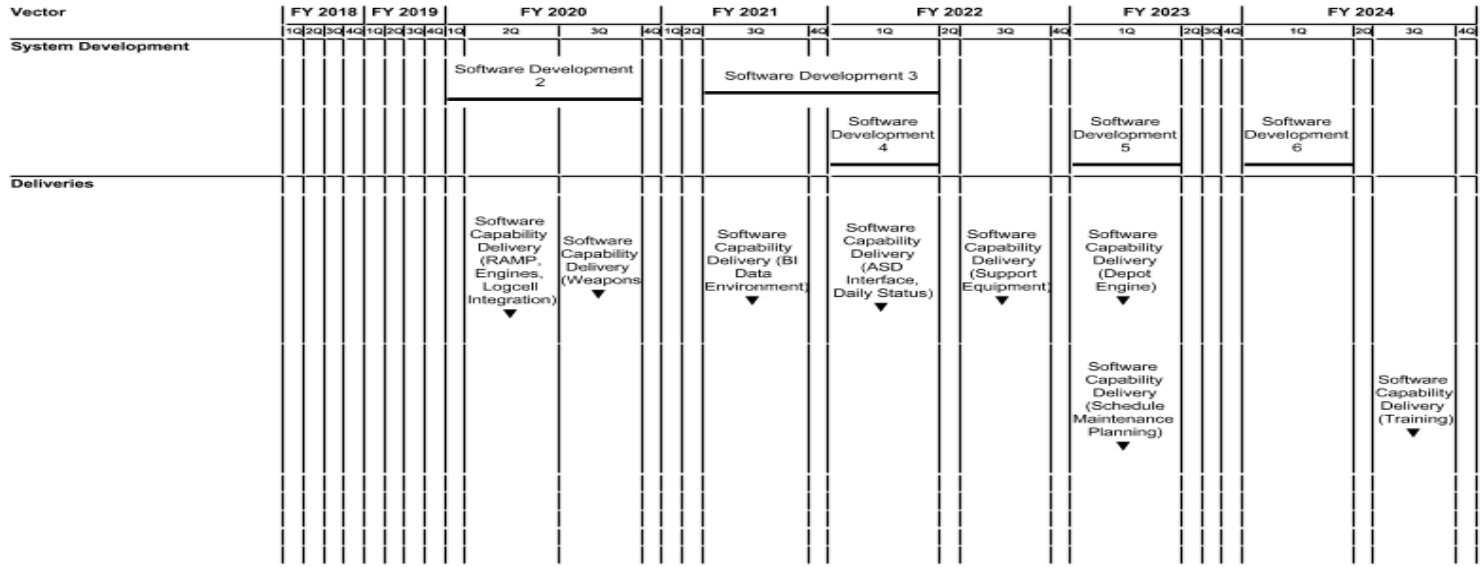


| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |



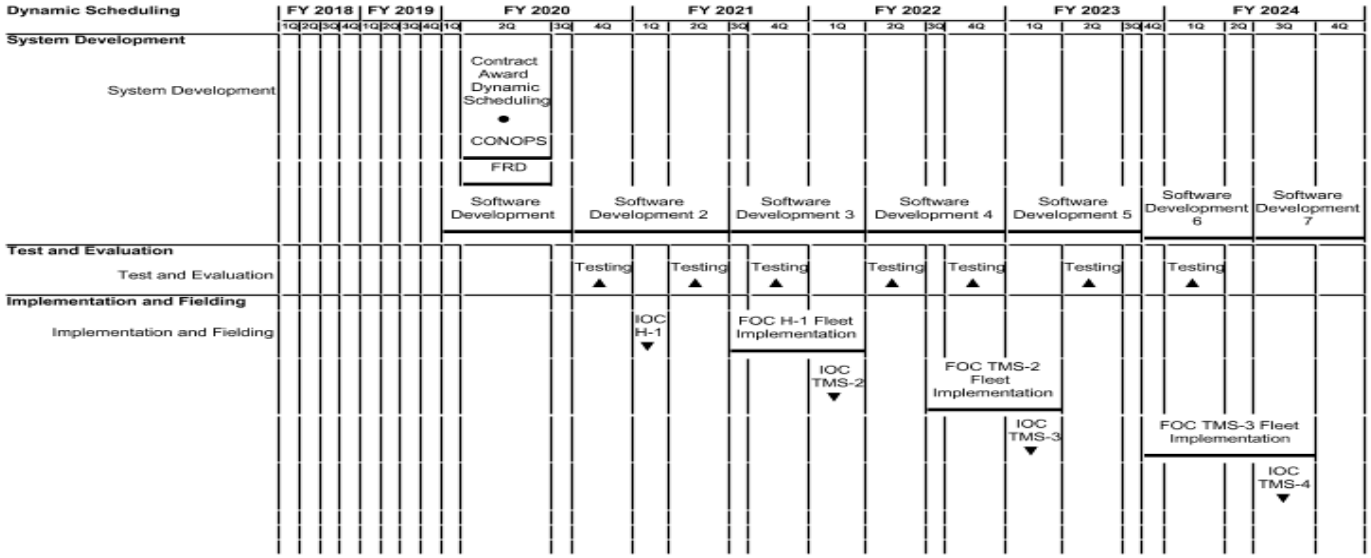

2020PB - 0605013N - 9406

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |




2020PB - 0605013N - 9406

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |




2020PB - 0605013N - 9406

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***DECKPLATE Aviation Data Warehouse OEM/DEPOT*** | | | | |
| Software Development: Contract Award OEM/DEPOT Reporting into DEKCPLATE | 1 | 2018 | 1 | 2018 |
| Software Development: OEM/DEPOT Software Development | 1 | 2018 | 4 | 2018 |
| Test & Evaluation: OEM/DEPOT IV&V Testing | 3 | 2018 | 3 | 2018 |
| Test & Evaluation: OEM/DEPOT Customer Acceptance Testing | 3 | 2018 | 4 | 2018 |
| Deliveries: OEM/DEPOT Production Release Delivery | 4 | 2018 | 4 | 2018 |
| ***DECKPLATE IT EXXCOMM Portfolio Consolidation*** | | | | |
| Systems Development: Software Development: Contract Award-DECKPLATE IT EXXCOMM Portfolio Consolidation Functionality 1 | 1 | 2018 | 1 | 2018 |
| Systems Development: Software Development: DECKPLATE Software Development 2 | 1 | 2018 | 4 | 2018 |
| Systems Development: Software Development: Contract Award-DECKPLATE IT EXXCOMM Portfolio Consolidation Functionality 2 | 1 | 2019 | 1 | 2019 |
| Systems Development: Software Development: DECKPLATE Software Development 3 | 1 | 2019 | 4 | 2019 |
| Systems Development: Software Development: Contract Award-DECKPLATE IT EXXCOMM Portfolio Consolidation Functionality 3 | 1 | 2019 | 1 | 2019 |
| Systems Development: Software Development: DECKPLATE Software Development 4 | 1 | 2020 | 4 | 2020 |
| Systems Development: Software Development: Software Development Contract Award | 1 | 2020 | 1 | 2020 |
| Systems Development: Software Development: FIAR & F35 IER Requirements and Design | 1 | 2020 | 2 | 2020 |
| Systems Development: Software Development: NAMS/Integrated Data Environment requirements, planning, data mapping 5 | 1 | 2020 | 4 | 2020 |
| Systems Development: Software Development: Business Intelligence (BI)/Analytics/ Vision 2020 Initiatives Requirements and Design | 1 | 2020 | 4 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Software Development: DECK-ALS/CMS Requirements and Design | 1 | 2020 | 3 | 2020 |
| Systems Development: Software Development: FIAR Software Development Integration, Testing and Implementation | 2 | 2020 | 4 | 2020 |
| Systems Development: Software Development: Software Development BI/Analytics/ Vision 2020: (IT Labor/HW/ Hosting/Licensing) | 2 | 2020 | 4 | 2020 |
| Systems Development: Software Development: Software Development F35 IER | 1 | 2020 | 3 | 2020 |
| Systems Development: Software Development: Software Development DECK-ALS/ CMS integration | 1 | 2020 | 3 | 2020 |
| Systems Development: Software Development: Software Development Contract Award 5 | 1 | 2021 | 1 | 2021 |
| Systems Development: Software Development: Requirements and Design 5 | 1 | 2021 | 1 | 2021 |
| Systems Development: Software Development: Software Development and Design: (IT Labor/HW/ Hosting/Licensing) 5 | 1 | 2021 | 3 | 2021 |
| Systems Development: Software Development: Software Development Contract Award 6 | 1 | 2022 | 1 | 2022 |
| Systems Development: Software Development: Requirements and Design 6 | 1 | 2022 | 3 | 2022 |
| Systems Development: Software Development: Software Development and Design: (IT Labor/HW/ Hosting/Licensing) 6 | 1 | 2022 | 3 | 2022 |
| Systems Development: Software Development: Software Development Contract Award 7 | 1 | 2023 | 1 | 2023 |
| Systems Development: Software Development: Requirements and Design 7 | 1 | 2023 | 2 | 2023 |
| Systems Development: Software Development: Software Development and Design: (IT Labor/HW/ Hosting/Licensing) 7 | 1 | 2023 | 3 | 2023 |
| Systems Development: Software Development: Software Development Contract Award 8 | 1 | 2024 | 1 | 2024 |
| Systems Development: Software Development: Requirements and Design 8 | 1 | 2024 | 2 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Software Development: Schedule DetailSoftware Development and Design: (IT Labor/HW/ Hosting/Licensing) 8 | 1 | 2024 | 3 | 2024 |
| Test & Evaluation: DECKPLATE IV&V Testing | 2 | 2020 | 2 | 2020 |
| Test & Evaluation: DECKPLATE Customer Acceptance Testing | 2 | 2020 | 3 | 2020 |
| Test & Evaluation: DECKPLATE IV&V Testing 2 | 2 | 2021 | 2 | 2021 |
| Test & Evaluation: DECKPLATE Customer Acceptance Testing 2 | 2 | 2021 | 3 | 2021 |
| Test & Evaluation: DECKPLATE IV&V Testing 3 | 2 | 2022 | 2 | 2022 |
| Test & Evaluation: DECKPLATE Customer Acceptance Testing 3 | 2 | 2022 | 3 | 2022 |
| Test & Evaluation: DECKPLATE IV&V Testing 4 | 2 | 2023 | 2 | 2023 |
| Test & Evaluation: DECKPLATE Customer Acceptance Testing 4 | 2 | 2023 | 3 | 2023 |
| Test & Evaluation: DECKPLATE IV&V Testing 5 | 2 | 2024 | 2 | 2024 |
| Test & Evaluation: DECKPLATE Customer Acceptance Testing 5 | 2 | 2024 | 3 | 2024 |
| Deliveries: DECKPLATE Production Release, Delivery 4.2.X | 4 | 2020 | 4 | 2020 |
| Deliveries: DECKPLATE Production Release Delivery 4.3.X | 4 | 2021 | 4 | 2021 |
| Deliveries: DECKPLATE Production Release Delivery 4.4.X | 4 | 2022 | 4 | 2022 |
| Deliveries: DECKPLATE Production Release Delivery 4.5.X | 4 | 2023 | 4 | 2023 |
| Deliveries: DECKPLATE Production Release Delivery 4.6.X | 4 | 2024 | 4 | 2024 |
| ***Condition Based Maintenance Plus (CBM+)*** | | | | |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition Production Capability 4 | 1 | 2018 | 1 | 2018 |
| Systems Development: Software Development: CBM+ Regime Recognition Production Capability 4 | 1 | 2018 | 3 | 2018 |
| Systems Development: Software Development: Contract Award-CBM+ Distributed File Storage and Analytics Enhancements 4 | 1 | 2018 | 1 | 2018 |
| Systems Development: Software Development: CBM+ Distributed File Storage and Analytics Enhancements 4 | 1 | 2018 | 4 | 2018 |
| Systems Development: Software Development: CBM+ Requirements Development 5 | 1 | 2018 | 4 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Software Development: Contract Award-CBM+ Component Tracking Integration 5 | 3 | 2018 | 3 | 2018 |
| Systems Development: Software Development: CBM+ Component Tracking Integration 5 | 3 | 2018 | 3 | 2019 |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition Production Capability 5 | 4 | 2019 | 4 | 2019 |
| Systems Development: Software Development: CBM+ Regime Recognition Production Capability 5 | 4 | 2019 | 4 | 2020 |
| Systems Development: Software Development: Contract Award-CBM+ Distributed File Storage and Analytics Enhancements 5 | 1 | 2019 | 1 | 2019 |
| Systems Development: Software Development: CBM+ Distributed File Storage and Analytics Enhancements 5 | 1 | 2019 | 4 | 2019 |
| Systems Development: Software Development: Contract Award-CBM+ Component Tracking Integration 6 | 1 | 2020 | 1 | 2020 |
| Systems Development: Software Development: Requirements and Design Component Tracking 6 | 1 | 2020 | 2 | 2020 |
| Systems Development: Software Development: CBM+ Component Tracking Integration 6 | 2 | 2020 | 3 | 2020 |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition (H-1) | 1 | 2020 | 1 | 2020 |
| Systems Development: Software Development: Requirements and Design Regime Recognition (H-1) | 1 | 2020 | 2 | 2020 |
| Systems Development: Software Development: CBM+ Regime Recognition Tracking Integration (H-1) | 2 | 2020 | 3 | 2020 |
| Systems Development: Software Development: CBM+ Regime Recognition Production (H-1) | 3 | 2020 | 4 | 2020 |
| Systems Development: Software Development: Contract Award-CBM+ Distributed File Storage and Analytics Enhancements and Data Warehouse Integration | 1 | 2020 | 1 | 2020 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: Software Development: Schedule DetailRequirements and Design Distributed File Storage and Analytics Enhancements and Data Warehouse | 1 | 2020 | 2 | 2020 |
| Systems Development: Software Development: CBM+ Distributed File Storage and Analytics Enhancements and Data Warehouse Integration | 2 | 2020 | 3 | 2020 |
| Systems Development: Software Development: CBM+ Distributed File Storage and Analytics Enhancements and Data Warehouse Production | 3 | 2020 | 4 | 2020 |
| Systems Development: Software Development: CBM+ Requirements Development 7 | 1 | 2020 | 3 | 2021 |
| Systems Development: Software Development: Contract Award-CBM+ Component Tracking Integration 7 | 3 | 2020 | 3 | 2020 |
| Systems Development: Software Development: CBM+ Component Tracking Integration 7 | 4 | 2020 | 4 | 2020 |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition Production Capability 7 | 4 | 2020 | 4 | 2021 |
| Systems Development: Software Development: CBM+ Requirements Development 8 | 3 | 2021 | 3 | 2022 |
| Systems Development: Software Development: Contract Award-CBM+ Component Tracking Integration 8 | 3 | 2021 | 3 | 2021 |
| Systems Development: Software Development: CBM+ Component Tracking Integration 8 | 4 | 2021 | 4 | 2021 |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition Production Capability 8 | 4 | 2021 | 4 | 2022 |
| Systems Development: Software Development: CBM+ Requirements Development 9 | 3 | 2022 | 3 | 2022 |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition Production Capability 9 | 4 | 2022 | 4 | 2023 |
| Systems Development: Software Development: CBM+ Requirements Development 10 | 3 | 2023 | 3 | 2023 |
| Systems Development: Software Development: Contract Award-CBM+ Regime Recognition Production Capability 10 | 3 | 2023 | 3 | 2023 |
| Systems Development: Software Development: CBM+ Component Tracking Integration 10 | 4 | 2024 | 4 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Aviation Logistics Environment (ALE)*** | | | | |
| Software Development: Software Documentation Development | 4 | 2018 | 4 | 2021 |
| Software Development: Software Requirements Gathering -Common Ground Station | 4 | 2018 | 1 | 2019 |
| Software Development: Ground Station Development (IT Labor/HW/Hosting/Licensing) | 4 | 2018 | 4 | 2018 |
| Software Development: Ground Station User Acceptance | 1 | 2019 | 4 | 2019 |
| Software Development: PLM Solution/IDE Software Requirements Gathering | 1 | 2019 | 4 | 2019 |
| Software Development: Software Development: PLM Solution/IDE Software (Limited Deployment 1) | 1 | 2019 | 4 | 2019 |
| Software Development: Software Development: PLM Solution/IDE Software (Limited Deployment 2) | 1 | 2020 | 4 | 2020 |
| Software Development: Software Development: PLM Solution/IDE Software (Limited Deployment 3) | 1 | 2021 | 4 | 2021 |
| Software Development: Software Development: PLM Solution/IDE Software (Limited Deployment 4) | 1 | 2022 | 4 | 2022 |
| Software Development: Software Development: PLM Solution/IDE Software (Limited Deployment 5) | 1 | 2023 | 4 | 2023 |
| Software Development: Software Development: PLM Solution/IDE Software FOC | 1 | 2024 | 1 | 2024 |
| Test and Evaluation: Ground Station Test and Evaluation | 1 | 2019 | 2 | 2020 |
| Implementation: Implementation: Ground Station Implementation 1 | 1 | 2021 | 1 | 2021 |
| Implementation: Implementation: Ground Station Implementation 2 | 1 | 2022 | 1 | 2022 |
| Implementation: Implementation: Ground Station Implementation 3 | 1 | 2023 | 1 | 2023 |
| Implementation: Implementation: Ground Station Implementation - FOC | 4 | 2024 | 4 | 2024 |
| ***Vector*** | | | | |
| System Development: Software Development 2 | 1 | 2020 | 3 | 2020 |
| System Development: Software Development 3 | 3 | 2021 | 1 | 2022 |
| System Development: Software Development 4 | 1 | 2022 | 1 | 2022 |
| System Development: Software Development 5 | 1 | 2023 | 1 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| System Development: Software Development 6 | 1 | 2024 | 1 | 2024 |
| Deliveries: Software Capability Delivery (RAMP, Engines, Logcell Integration) | 2 | 2020 | 2 | 2020 |
| Deliveries: Software Capability Delivery (Weapons) | 3 | 2020 | 3 | 2020 |
| Deliveries: Software Capability Delivery (BI Data Environment) | 3 | 2021 | 3 | 2021 |
| Deliveries: Software Capability Delivery (ASD Interface, Daily Status) | 1 | 2022 | 1 | 2022 |
| Deliveries: Software Capability Delivery (Support Equipment) | 3 | 2022 | 3 | 2022 |
| Deliveries: Software Capability Delivery (Depot Engine) | 1 | 2023 | 1 | 2023 |
| Deliveries: Software Capability Delivery (Schedule Maintenance Planning) | 1 | 2023 | 1 | 2023 |
| Deliveries: Software Capability Delivery (Readiness Training) | 3 | 2024 | 3 | 2024 |
| ***Dynamic Scheduling*** | | | | |
| System Development: System Development: Contract Award Dynamic Scheduling | 2 | 2020 | 2 | 2020 |
| System Development: System Development: Concept of Operations (CONOPS) | 2 | 2020 | 2 | 2020 |
| System Development: System Development: Functional Reqwuirements Document (FRD) | 2 | 2020 | 2 | 2020 |
| System Development: System Development: Software Development | 1 | 2020 | 3 | 2020 |
| System Development: System Development: Software Development 2 | 4 | 2020 | 2 | 2021 |
| System Development: System Development: Software Development 3 | 3 | 2021 | 1 | 2022 |
| System Development: System Development: Software Development 4 | 2 | 2022 | 4 | 2022 |
| System Development: System Development: Software Development 5 | 1 | 2023 | 3 | 2023 |
| System Development: System Development: Software Development 6 | 4 | 2023 | 2 | 2024 |
| System Development: System Development: Software Development 7 | 3 | 2024 | 4 | 2024 |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing | 4 | 2020 | 4 | 2020 |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing 2 | 2 | 2021 | 2 | 2021 |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing 3 | 4 | 2021 | 4 | 2021 |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing 4 | 2 | 2022 | 2 | 2022 |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing 5 | 4 | 2022 | 4 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9406 / *Maintenance Data Warehouse* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing 6 | 2 | 2023 | 2 | 2023 |
| Test and Evaluation: Test and Evaluation: Dynamic Scheduling Testing 7 | 1 | 2024 | 1 | 2024 |
| Implementation and Fielding: Implementation and Fielding: Initial Operational Capability (IOC) Single Squadron H-1 | 1 | 2021 | 1 | 2021 |
| Implementation and Fielding: Implementation and Fielding: Full Operation Capability (FOC) (H-1 Fleet Implementation) | 3 | 2021 | 1 | 2022 |
| Implementation and Fielding: Implementation and Fielding: Initial Operational Capability (IOC) Single Squadron TMS-2 | 1 | 2022 | 1 | 2022 |
| Implementation and Fielding: Implementation and Fielding: Full Operation Capability (FOC) (TMS-2 Fleet Implementation) | 3 | 2022 | 1 | 2023 |
| Implementation and Fielding: Implementation and Fielding: Initial Operational Capability (IOC) Single Squadron TMS-3 | 1 | 2023 | 1 | 2023 |
| Implementation and Fielding: Implementation and Fielding: Full Operation Capability (FOC) (TMS-3 Fleet Implementation) | 4 | 2023 | 3 | 2024 |
| Implementation and Fielding: Implementation and Fielding: Initial Operational Capability (IOC) Single Squadron TMS-4 | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605013N / *Information Technology Development* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 13.997 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 23.997 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

CONDITION BASED MAINTENANCE PLUS (CBM+):

The CBM+ solution is an initiative which provides Naval Aviation Enterprise with common enabling capabilities which deliver timely data-driven decisional information to optimize aircraft availability and materiel readiness by incorporating health and usage leading indicators into the failure mode mitigation process, enabling the Warfighter to more efficiently meet mission requirements through automated analysis and decision making processes. The CBM+ Initiative increases readiness through streamlined maintenance processes which provide actionable logistics/engineering data and integrated analytics not previously available, enabling engineers and acquisition professionals to support system improvements based on CBM+ acquired data and analytic results. CBM+ provides the enabling infrastructure and storage solutions within an Enterprise common environment needed to store and analyze weapon system sensor data to extend the life of current and new acquisition aircraft, realizing savings from reductions in field (organizational and intermediate) maintenance actions, reduced functional check flight hours, mishap mitigation, and reduced parts usage.

PRODUCT LIFECYCLE MANAGEMENT (PLM):

This program includes funding to support Information Technology (IT) Rationalization and Product Lifecycle Management migration efforts to modernize NAVSEA's Technical Data, Configuration and Logistics IT systems. This will enable advanced warfighter readiness capabilities in accordance with OPNAV N4's Digital Transformation Vision. This IT solution will be used by over 40,000 civilian and military personnel, impacting a yearly $6.5B investment in product sustainment. The absence of a centrally sponsored PLM with a commonly defined and enforced system and data architecture has resulted in a proliferation of unique non-standardized, non-integrated, stove-piped IT solutions across the Navy, all supporting singular logistics functions and none able to influence warfighter readiness holistically. To enable enterprise readiness analytics, this effort will eliminate stove-piped legacy logistics IT applications and in place field an NAVSEA PLM capability that enables programs to acquire and manage product support data/information within a single, structured, authoritative product data environment linking material readiness outcomes to the Program's core systems engineering processes. The key enabling construct of the PLM is a digital thread/digital twin capability which provides a formal framework for controlled interplay of authoritative technical and as-built data with the ability to access, integrate, transform and analyze data throughout the product lifecycle into actionable information. Moreover as these capabilities mature, the cost of readiness becomes significantly more affordable and combat logistics operations become significantly more effective. As the Navy realizes these outcomes, Enterprise Digital Logistics IT services effectively become combat multipliers. The most significant benefit being that they maximize the effectiveness of our warfighters as we deliver them right data, at the right time, so they can continuously make the right decision faster than the enemy.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Enterprise Condition Based Maintenance | 4.346 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***FY 2018 Accomplishments:*** Congressional Plus-up resourced algorithm and analytic research and development associated with Condition Based Maintenance Plus (CBM+) supporting NAVAIR Engineering, Logistics, and Data Science communities, while collaborating with academia and Industry to identify algorithms capable of correlating cause and effect of statistical anomalies in collected weapons system sensor data at scale. Algorithm development required the integration of academia's best practices and industry leading COTS analytic solutions to evaluate applications and proof of concept efforts for implementation across naval aviation. Algorithm development and testing required large scale sensor data storage and compute capability provided by NAVAIR's Standard Data Repository data platform and integrated analytics.<br><br>Facilitated work on algorithms and analytics associated with Condition Based Maintenance Plus (CBM+) software research/development. Funding supported contract support services for infrastructure standup and integration within the closed loop and connected test environments as required to support COTS product evaluations associated with Congressional Plus-Up efforts. Support focused on system integration, Cyber Security compliance, Information Assurance, Content Management, as related to enterprise and edge node compute capability.<br><br>Facilitated work on algorithms and analytics associated with Condition Based Maintenance Plus (CBM+) software research/development. Funding supported the investigation and configuration of industry leading COTS solutions for data translation, mining, analytics, distribution, visualization, accessibility for NAVAIR Engineering, Logistics and Data Science communities to evaluation to determine new diagnostic and prognostic methodologies which leverage all available data supporting naval aviation support processes. Specific focus enabled COTS solutions in support of Conditioned Based Maintenance Plus (CBM+) capabilities and objectives in direct support of fleet mission effectiveness and weapon system readiness improvements. COTS product proof of concept evaluations focused on Enterprise level and Edge analytics enablement and integration with warfighter maintenance/support processes. Implementation strategies assessed, included premises, connected/ disconnected concepts of operation, cloud, and hybrid approaches, while provided cloud readiness assessments for current and future CBM+ IT systems and applications.<br>***FY 2019 Plans:*** N/A | | |
| ***Congressional Add:*** Enterprise Product Lifecycle Management<br>***FY 2018 Accomplishments:*** Congressional Add: Product Lifecycle Management (PLM)<br><br>1. Established the acquisition program baseline | 9.651 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| 2. Competitively awarded PLM prototype efforts<br>3. Completed Phase 1 of the PLM prototypes<br>***FY 2019 Plans:*** N/A | | |
| ***Congressional Add:*** Advanced Radar Condition Based Maintenance<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** N/A | 0.000 | 10.000 |
| **Congressional Adds Subtotals** | 13.997 | 10.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

CONDITION BASED MAINTENANCE PLUS:
Development services will be provided using a competitively awarded contract coordinated via NAVAIR's Aviation Logistics Environment (ALE) Program Management and supporting Contract Business Office, and will contain a matrix of tasks and required levels of performance. Follow on Contracts will utilize the same competitive system. The Services provided under the contract support acquisition will not encompass tasks inherently Governmental in nature, and Statements of Work will include a matrix that establishes the minimum acceptable performance standards.

PRODUCT LIFECYCLE MANAGEMENT:
Product Lifecycle Management development services will be solicited in late FY 18 / early FY 19 using competitively awarded contracts and Government programmatic and technical subject matter expertise to rapidly prototype core product data management, readiness at cost decision modeling and timely and relevant bi-directional distribution of serialized readiness data analytics capabilities. Follow on contracts will utilize the same competitive system and leverage previous prototyping efforts and lessons learned to the maximum extent possible. Contractual services will not encompass tasks inherently Governmental in nature and will include a matrix that establishes the minimum acceptable performance standards.

**E. Performance Metrics**

CONDITION BASED MAINTENANCE PLUS:
1. Metric - During the life of the contract verify conformance with agency specific information processing standards and functional requirements. Prior to delivery of enhanced software, demonstrate the operational capability of the system software. Standard - Functionality of the software to meet required systems architecture and processing capabilities. Max Deviation Allowed - All requirements mandated by law or regulation must be 100% compliant. Quality Assurance - Independent Verification

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

and Validation (IV&V) for testing new releases of software to determine that previous functionality is maintained. Customer satisfaction as measured through limited validated customer complaints, feedback, and surveys.
2. Metric - Interfaces must maintain compatibility among system components in the operational environment. Standard - Service Levels for software: Throughput in terms of processing response time, number of transactions processed per second; volume of data processed over time. Compatibility with particular hardware and software within the existing processing environment. Functionality of software to meet required systems architecture and processing capabilities. Max Deviation Allowed - None. Quality Assurance - Customer satisfaction as measured through limited validated customer complaints, feedback and surveys. Operational monitoring by use of system statistics and logs. IV&V for testing new software, including verifying results to determine that requirements and specifications are met.
3. Metric - Documentation for deliverables must match the agency specific system processing and operational procedures. Standard - Documentation meets agency specific formats for accuracy and completeness. Max Deviation Allowed - None. Quality Assurance - IV&V for determining that documentation delivered by the contractor matches the system processing and operational procedures.
4. Metric - Meet delivery dates/milestones. Period of Performance will be 12 months from the date of award. Standard - Delivery dates are met, or exceeded. Max Deviation Allowed - None. Quality Assurance - 100% inspection.
5. Metric - Security. Standard - Meet all Government and agency specific requirements. Max Deviation Allowed - None. Quality Assurance - 100% inspection to ensure that all Government and Agency specific requirements have been met. Independent verification of security procedures defined by agency (could be performed by a third party, or another agency according to current security regulations and measures).
6. Metric - Enhancement to software shall not adversely affect system performance. Standard - Standards affecting system performance include but are not limited to: response time for resolving problems; central processing unit busy; response time; memory utilization; storage utilization. Max Deviation Allowed - Base line functionality is met at 100%. Non critical functionality is met at 95%. Quality Assurance - Operational monitoring by use of system statistics and logs.
7. Metric - New releases of software must maintain previously provided functionality, while providing enhanced capabilities, or systems corrections. Standard - Software adds value and improves existing functionality without negatively impacting the existing operational environment. Max Deviation Allowed - Base line functionality is met at 100%. Non critical functionality is met at 95%. Quality Assurance - Independent Verification and Validation for testing new releases of software to determine that previous functionality is improved. Customer satisfaction is measured through validated customer complaints and surveys.

PRODUCT LIFECYCLE MANAGEMENT:
1. Resource Sponsor approved and POM aligned acquisition program baseline will be defined by the competitive prototype acquisition process and consistent with the OPNAV Digital Transformation Team plan.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technology Refreshment (PLM) | Various | Various : Various | 0.000 | 4.150 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.150 | - |
| | | **Subtotal** | 0.000 | 4.150 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.150 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HW/SW (CBM+) | C/FFP | Washington HQ Services : Washington, DC | 0.000 | 2.626 | Sep 2018 | 3.788 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 6.414 | 1.575 |
| Software Development for (CBM+) | C/CPFF | Wyle : Patuxent River, MD | 0.000 | 1.700 | Sep 2018 | 0.000 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.700 | 2.700 |
| Systems Engineering (PLM) | WR | NSWC : Philadelphia, PA | 0.000 | 0.425 | Sep 2018 | 0.355 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.780 | - |
| Systems Engineering (PLM) | WR | NSWC : Crane, ID | 0.000 | 0.646 | Sep 2018 | 0.618 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.264 | - |
| Systems Engineering (PLM) | WR | NSWC : Port Hueneme, CA | 0.000 | 0.414 | Sep 2018 | 1.830 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.244 | - |
| Technical Support (PLM) | Various | Various : Various | 0.000 | 2.865 | Sep 2018 | 0.000 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 2.865 | - |
| Systems Engineering (PLM) | WR | NSWC : Carderock, MD | 0.000 | 0.384 | Sep 2018 | 0.496 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.880 | - |
| Systems Engineering (PLM) | WR | NSWC : Dahlgren, VA | 0.000 | 0.305 | Sep 2018 | 0.225 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.530 | - |
| Systems Engineering (PLM) | WR | NAVSEALOGCEN : Mechanicsburg, PA | 0.000 | 0.462 | Sep 2018 | 2.688 | Sep 2019 | 0.000 | | - | | 0.000 | 0.000 | 3.150 | - |
| | | **Subtotal** | 0.000 | 9.827 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.827 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

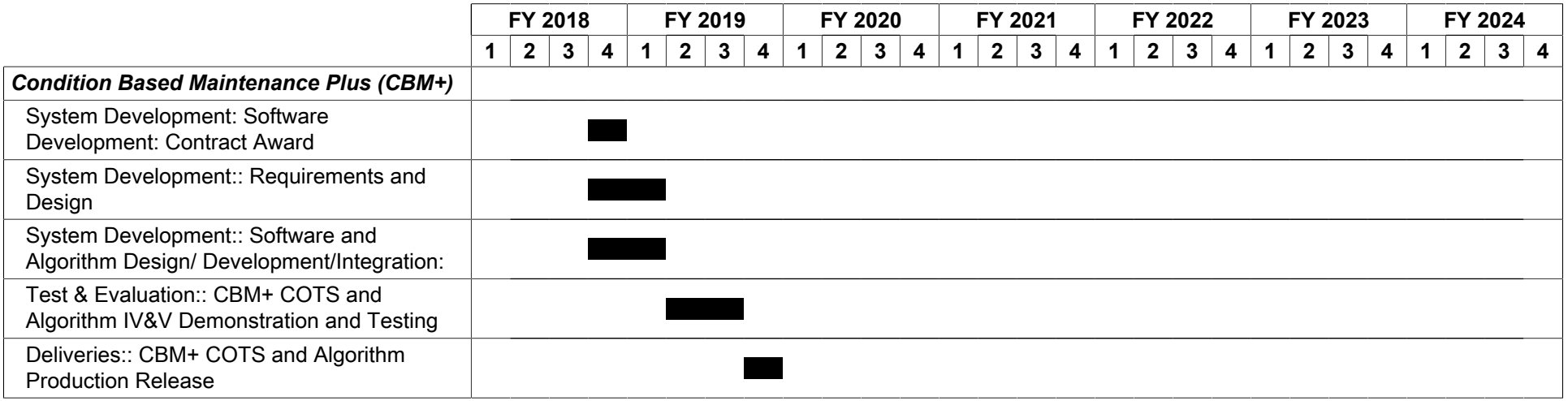
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support for (CBM+) | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.020 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.020 | - |
| | | **Subtotal** | 0.000 | 0.020 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.020 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 13.997 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 23.997 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605013N / *Information Technology Development* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Condition Based Maintenance Plus (CBM+)*** | | | | |
| System Development: Software Development: Contract Award | 4 | 2018 | 4 | 2018 |
| System Development:: Requirements and Design | 4 | 2018 | 1 | 2019 |
| System Development:: Software and Algorithm Design/ Development/Integration: | 4 | 2018 | 1 | 2019 |
| Test & Evaluation:: CBM+ COTS and Algorithm IV&V Demonstration and Testing | 2 | 2019 | 3 | 2019 |
| Deliveries:: CBM+ COTS and Algorithm Production Release | 4 | 2019 | 4 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605024N *I (U)Anti-Tamper Technology Support* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.500 | 3.900 | 5.618 | 4.882 | - | 4.882 | 7.974 | 7.843 | 7.436 | 7.583 | Continuing | Continuing |
| 2801: *Anti-Tamper* | 0.000 | 0.000 | 1.379 | 1.404 | - | 1.404 | 1.433 | 1.463 | 1.492 | 1.522 | Continuing | Continuing |
| 3414: *Anti-Tamper Technology Support* | 0.500 | 3.900 | 4.239 | 3.478 | - | 3.478 | 6.541 | 6.380 | 5.944 | 6.061 | Continuing | Continuing |

**Note**

The funding increase from FY 2018 to FY 2019 reflects the realignment of Project 2801 Anti-Tamper into the current Program Element (PE) from Management, Technical & Intl Supt. PE 0605853N.

**A. Mission Description and Budget Item Justification**

Develops new and novel Anti-Tamper technologies for all Department of Navy weapon and combat systems. The technologies to be developed will be new countermeasures to prevent reverse engineering of critical U.S. military systems. The technologies include secure processing, sensors, architecture components, and enabling technologies.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 3.410 | 5.618 | 6.252 | - | 6.252 |
| Current President's Budget | 3.900 | 5.618 | 4.882 | - | 4.882 |
| Total Adjustments | 0.490 | 0.000 | -1.370 | - | -1.370 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 0.500 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.010 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -1.372 | - | -1.372 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.002 | - | 0.002 |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $0.780 million to account for the availability of prior year execution balances.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605024N *I (U)Anti-Tamper Technology Support* |

Schedule: Not Applicable
Technical: Not Applicable

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | Project (Number/Name)<br>2801 / *Anti-Tamper* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2801: *Anti-Tamper* | 0.000 | 0.000 | 1.379 | 1.404 | - | 1.404 | 1.433 | 1.463 | 1.492 | 1.522 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

The funding increase from FY 2018 to FY 2019 reflects the realignment of Project 2801 Anti-Tamper into the current Program Element (PE) from Management, Technical & Intl Supt. PE 0605853N.

**A. Mission Description and Budget Item Justification**

Anti-Tamper Program - Perform as the Navy Technical Process Owner for the Anti-Tamper (AT) systems engineering activity that is intended to prevent and/or delay the exploitation of critical technologies in U.S. Systems. Manage the research, design, development, implementation, and testing of AT measures. Coordinate with Department of Defense AT Executive Agent and implement Department of Navy AT policy in conjunction with the Deputy Assistant Secretary Navy. Manage Security and Information Security requirements commensurate with the requirements of ALL Navy Programs throughout their lifecycles.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Anti Tamper Support | 0.000 | 1.379 | 1.404 | 0.000 | 1.404 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue championing new technology with a focused and disciplined approach of development, assessment, evaluation, and transition to meet Navy program AT requirements. Maintain role in Anti-Tamper policy development for implementation and execution by the SYSCOMs incorporating Navy program AT requirements. Provide secure facilities, networks, computers, video/telephone conference and support personnel for collateral and Special Program operational environments to enable Anti-Tamper (AT) implementation and execution by SYSCOM's programs, incorporating AT requirements. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue championing new technology with a focused and disciplined approach of development, assessment, evaluation, and transition to meet Navy program AT requirements. Maintain role in Anti-Tamper policy development for implementation and execution by the SYSCOMs incorporating Navy program AT requirements. Provide secure facilities, networks, computers, video/telephone conference and support personnel for collateral and Special Program operational environments to enable Anti-Tamper implementation and execution by SYSCOM's programs, incorporating AT requirements. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | **Project (Number/Name)**<br>2801 / *Anti-Tamper* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>There is no significant change from FY 2019 to FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 1.379 | 1.404 | 0.000 | 1.404 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The program will fund project to provide secure facilities, networks, computers, video/telephone conference and support personnel for collateral and Special Program operational environments

**E. Performance Metrics**

Manage the research, design, development, implementation and testing of Anti-Tamper measures for the Department of the Navy. Manage Information Security for all navy programs throughout their lifecycles.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | Project (Number/Name)<br>2801 / *Anti-Tamper* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 1.079 | Dec 2018 | 1.095 | Oct 2019 | - | | 1.095 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 1.079 | | 1.095 | | - | | 1.095 | Continuing | Continuing | N/A |

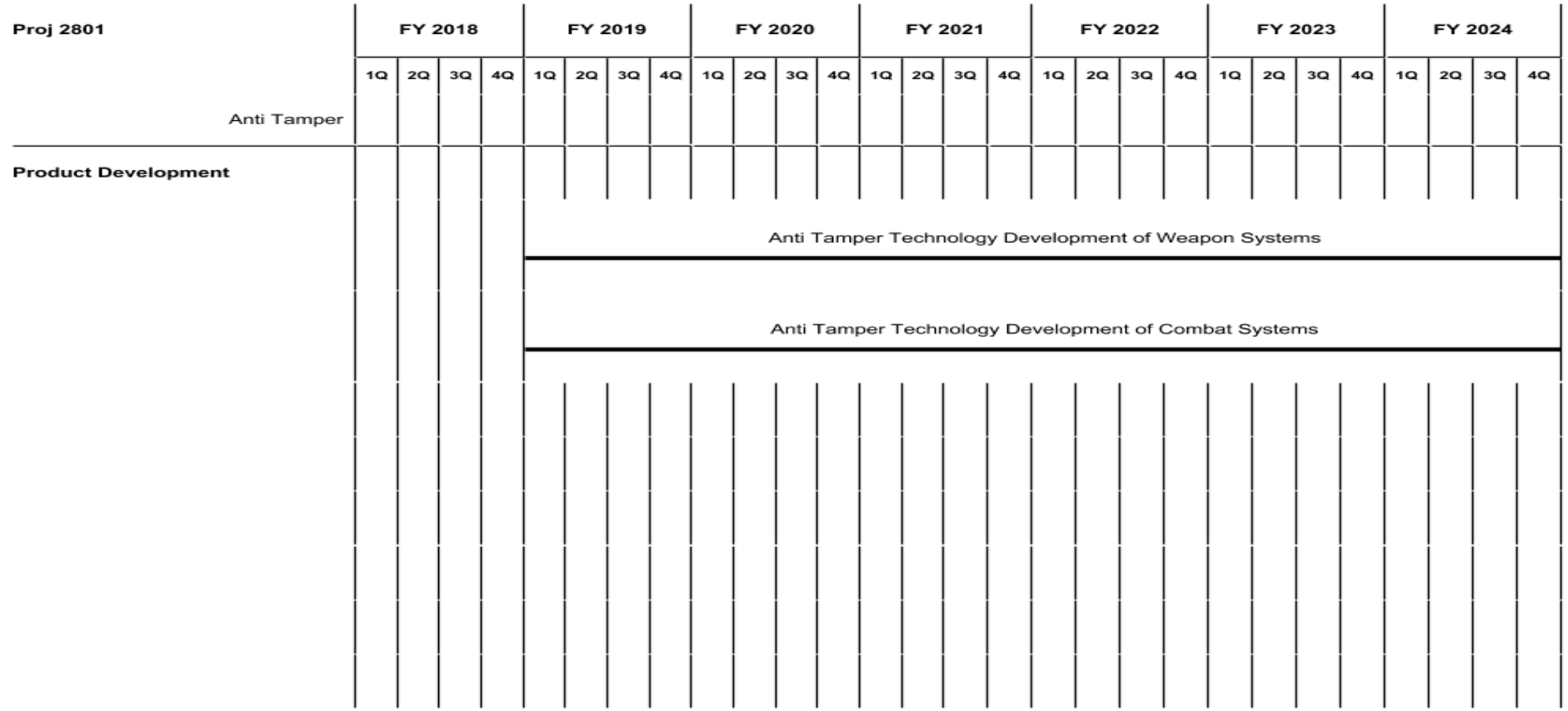
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.300 | Nov 2018 | 0.309 | Oct 2019 | - | | 0.309 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.300 | | 0.309 | | - | | 0.309 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 1.379 | | 1.404 | | - | | 1.404 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | **Project (Number/Name)**<br>2801 / *Anti-Tamper* |




*2020DON - 0605024N - 2801*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | **Project (Number/Name)**<br>2801 / *Anti-Tamper* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2801*** | | | | |
| Product Development: Anti Tamper Technology Development of Weapon Systems | 1 | 2019 | 4 | 2024 |
| Product Development: Anti Tamper Technology Development of Combat Systems | 1 | 2019 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | Project (Number/Name)<br>3414 / *Anti-Tamper Technology Support* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3414: *Anti-Tamper Technology Support* | 0.500 | 3.900 | 4.239 | 3.478 | - | 3.478 | 6.541 | 6.380 | 5.944 | 6.061 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

The FY 2020 funding request was reduced by $.780 million to account for the availability of prior year execution balances.

**A. Mission Description and Budget Item Justification**

This project develops new and novel Anti-Tamper technologies for all Department of Navy weapon and combat systems. The technologies to be developed will be new countermeasures to prevent reverse engineering of critical U.S. military systems. The technologies include secure processing, sensors, architecture components, and enabling technologies. Low technology readiness level projects will be tested for maturation and implemented to protect US technologies. Government laboratory expertise will mature in Anti Tamper technologies and techniques. Integration of various techniques will enhance the strength of the protection scheme which limits the opportunities to exploit our technological advantage on the battlefield.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Anti Tamper Technology Development | 3.900 | 4.239 | 3.478 | 0.000 | 3.478 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This project develops new and novel Anti-Tamper technologies for all Department of Navy weapon and combat systems. The technologies to be developed will be new countermeasures to prevent reverse engineering of critical U.S. military systems. The technologies include secure processing, sensors, secure architecture components, and enabling technologies. | | | | | |
| ***FY 2019 Plans:***<br>Continue development of new and novel technologies that will become reverse engineering countermeasures for Department of the Navy (DoN) weapon and combat systems. The project will include awarding technology development contracts and securing engineering support from DoN engineering facilities. Test and perform technical evaluations of low technical readiness level projects for implementation to protect US technologies. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue development of new and novel technologies that will become reverse engineering countermeasures for Department of the Navy weapon and combat systems. The project will include awarding technology | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | **Project (Number/Name)**<br>3414 / *Anti-Tamper Technology Support* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| development contracts and securing engineering support from DoN engineering facilities. Test and perform technical evaluations of low technical readiness level projects for implementation to protect US technologies.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease between FY 2019 and FY 2020 due to the availability of prior year execution balances. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 3.900 | 4.239 | 3.478 | 0.000 | 3.478 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

This is a non-ACAT program. The strategy will be to issue technology development contracts and use Department of Navy (DoN)labs for technology development, along with using DoN engineering organizations for engineering support.

**E. Performance Metrics**

The project will fund between 4 and 8 technology development projects that will be focused on bringing anti-tamper technologies that transition to the DoN programs. The project will have a greater than 67% transition rate.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | Project (Number/Name)<br>3414 / *Anti-Tamper Technology Support* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Dev | WR | NAWCWD : China Lake, CA | 0.500 | 2.490 | Nov 2017 | 2.955 | Nov 2018 | 1.739 | Oct 2019 | - | | 1.739 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.500 | 2.490 | | 2.955 | | 1.739 | | - | | 1.739 | Continuing | Continuing | N/A |

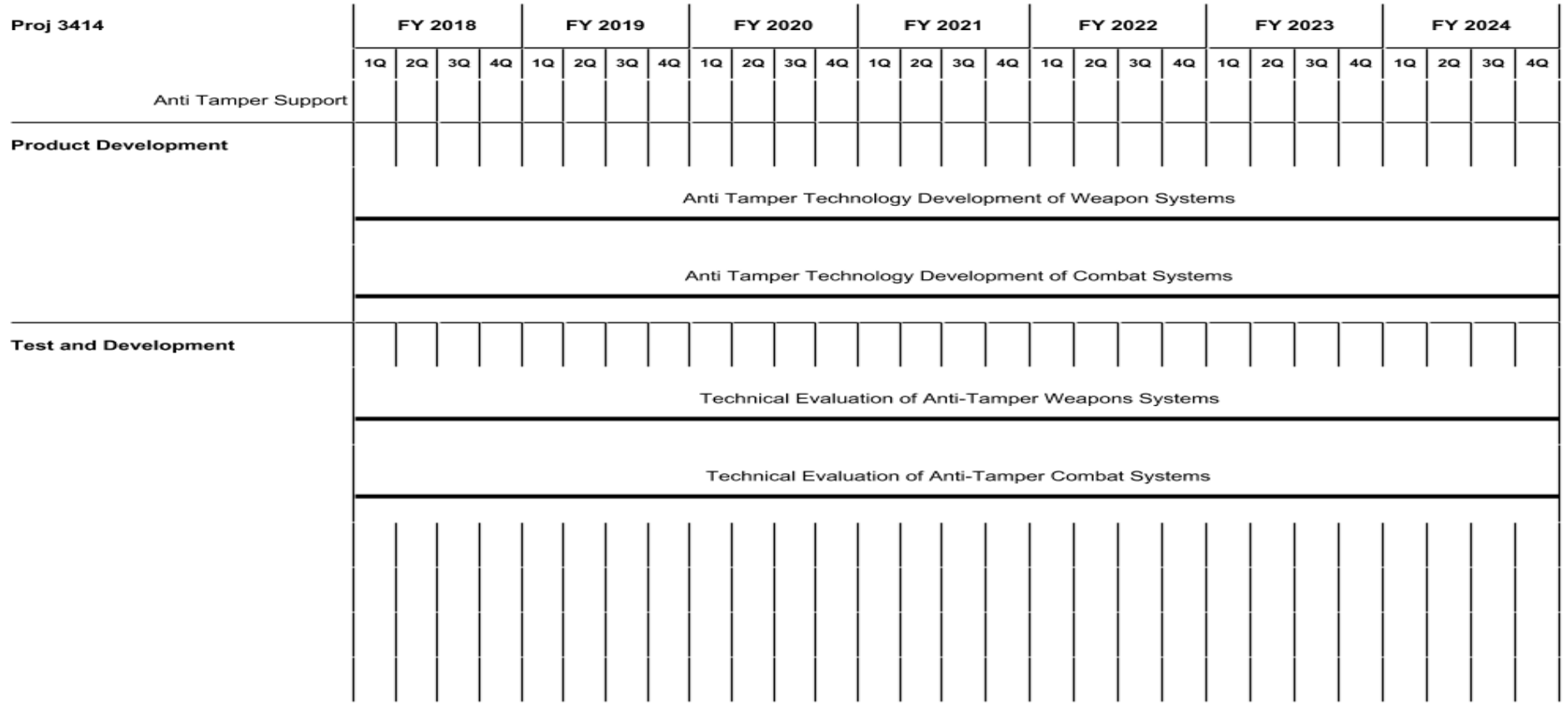
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NAWCWD : China Lake, CA | 0.000 | 1.410 | Nov 2017 | 1.284 | Nov 2018 | 1.739 | Oct 2019 | - | | 1.739 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 1.410 | | 1.284 | | 1.739 | | - | | 1.739 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.500 | 3.900 | | 4.239 | | 3.478 | | - | | 3.478 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | **Project (Number/Name)**<br>3414 / *Anti-Tamper Technology Support* |




*2020DON - 0605024N - 3414*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605024N / *(U)Anti-Tamper Technology Support* | **Project (Number/Name)**<br>3414 / *Anti-Tamper Technology Support* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3414*** | | | | |
| Product Development: Anti Tamper Technology Development of Weapon Systems | 1 | 2018 | 4 | 2024 |
| Product Development: Anti Tamper Technology Development of Combat Systems | 1 | 2018 | 4 | 2024 |
| Test and Development: Technical Evaluation of Anti-Tamper Weapons Systems | 1 | 2018 | 4 | 2024 |
| Test and Development: Technical Evaluation of Anti-Tamper Combat Systems | 1 | 2018 | 4 | 2024 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 0.000 | 336.945 | 516.955 | - | 516.955 | 251.359 | 20.631 | 21.090 | 21.500 | Continuing | Continuing |
| 3059: *CH-53K Development* | 0.000 | 0.000 | 326.945 | 516.955 | - | 516.955 | 251.359 | 20.631 | 21.090 | 21.500 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.000 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 390 | | | | | | | | | | | | |

**Note**

PB-19 realigned the CH-53K Development Efforts from PE 0605212N /CH-53K to this PE 0605212M /CH-53K.

**A. Mission Description and Budget Item Justification**

The CH-53 is the only marinized heavy-lift helicopter in the world and is the Marine Corps only heavy-lift helicopter. The CH-53 mission is the conduct of expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel to support distributed operations deep inland from a sea-based center of operations. The CH-53E "Super Stallion" was introduced into operations in 1980 as an upgrade version of the CH-53D. The CH-53E has developed performance degradation, fatigue life, interoperability, maintenance supportability, and other operational concerns. An improved CH-53 is needed to support Marine Air-Ground Task Force heavy-lift requirements in the 21st century joint environment. The CH-53K "King Stallion" will provide improvements in range and payload, performance, cargo handling, turn-around times, reliability and maintainability, interoperability, and survivability. The CH-53K program is required to provide full system capability, including shipboard compatibilities, at Initial Operational Capability (IOC).

Total aircraft quantities for the CH-53K program are 205 helicopters. This currently includes one Ground Test Vehicle (GTV) and four Engineering Development Models (EDMs) for System Development and Demonstration (SDD) purchased with Research, Development, Test & Evaluation (RDT&E) funds. Of the remaining 200 aircraft, six were System Demonstration Test Articles (SDTAs) and are incrementally funded using RDT&E funds and 194 aircraft are funded with Aircraft Procurement, Navy (APN). The SDTAs will be used to prove out production and integration processes on a pilot production line, and to provide aircraft for Initial Operational Test and Evaluation. Development contract overruns resulted in insufficient funding levels to continue work on SDTA 5&6 and the contract was modified to avoid further expenditure. The program will discontinue SDTA 5&6 efforts and DD-250 SDTA 5&6 parts to become Government property. Only SDTA 1-4 will remain to be utilized as previously planned. The program of record of aircraft quantity remains 200, four of which are SDTA and 196 aircraft to be APN funded. The proposed plan has been provided during the Above Threshold Reprogramming briefings/discussions, Requests for Information responses, and will be footnoted in the Selected Acquisition Report.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 326.945 | 296.281 | - | 296.281 |
| Current President's Budget | 0.000 | 336.945 | 516.955 | - | 516.955 |
| Total Adjustments | 0.000 | 10.000 | 220.674 | - | 220.674 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 10.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | 220.386 | - | 220.386 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.288 | - | 0.288 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Wireless Intercom System* | 0.000 | 5.000 |
| Congressional Add: *Common Lightweight Cargo System* | 0.000 | 5.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 10.000 |
| Congressional Add Totals for all Projects | 0.000 | 10.000 |

**Change Summary Explanation**

FY 2020 funds CH-53K SDD activities to include additional ground and flight test of one GTV, four EDMs and four SDTAs, associated subsystems and components.

Technical: Not applicable.
Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | Project (Number/Name)<br>3059 / *CH-53K Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3059: *CH-53K Development* | 0.000 | 0.000 | 326.945 | 516.955 | - | 516.955 | 251.359 | 20.631 | 21.090 | 21.500 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 390

**Note**

PB-19 realigned the CH-53K Development Efforts from PE 0605212N /CH-53K to this PE 0605212M /CH-53K.

**A. Mission Description and Budget Item Justification**

The CH-53 is the only marinized heavy-lift helicopter in the world and is the Marine Corps only heavy-lift helicopter. The CH-53 mission is the conduct of expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel to support distributed operations deep inland from a sea-based center of operations. The CH-53E "Super Stallion" was introduced into operations in 1980 as an upgrade version of the CH-53D. The CH-53E has developed performance degradation, fatigue life, interoperability, maintenance supportability, and other operational concerns. An improved CH-53 is needed to support Marine Air-Ground Task Force heavy-lift requirements in the 21st century joint environment. The CH-53K "King Stallion" will provide improvements in range and payload, performance, cargo handling, turn-around times, reliability and maintainability, interoperability, and survivability. The CH-53K program is required to provide full system capability, including shipboard compatibilities, at Initial Operational Capability (IOC).

Total aircraft quantities for the CH-53K program are 205 helicopters. This currently includes one Ground Test Vehicle (GTV) and four Engineering Development Models (EDMs) for System Development and Demonstration (SDD) purchased with Research, Development, Test & Evaluation (RDT&E) funds. Of the remaining 200 aircraft, six were System Demonstration Test Articles (SDTAs) and are incrementally funded using RDT&E funds and 194 aircraft are funded with Aircraft Procurement, Navy (APN). The SDTAs will be used to prove out production and integration processes on a pilot production line, and to provide aircraft for Initial Operational Test and Evaluation. Development contract overruns resulted in insufficient funding levels to continue work on SDTA 5&6 and the contract was modified to avoid further expenditure. The program will discontinue SDTA 5&6 efforts and DD-250 SDTA 5&6 parts to become Government property. Only SDTA 1-4 will remain to be utilized as previously planned. The program of record of aircraft quantity remains 200, four of which are SDTAs and 196 aircraft to be APN funded. The proposed plan has been provided during the Above Threshold Reprogramming briefings/discussions, Requests for Information responses, and will be footnoted in the Selected Acquisition Report.

FY 2020 RDT&E funds CH-53K SDD activities to include additional ground and flight test of one GTV, four EDMs and four SDTAs, associated subsystems and components.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Air Vehicle Development | 0.000 | 278.645 | 457.423 | 0.000 | 457.423 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue additional ground and flight test of the CH-53K GTV, EDMs and their associated subsystems and components in preparation of IOT&E. Continue to evaluate and implement producability, reliability and capability improvements during fabrication and assembly of System Demonstration Test Articles.<br>***FY 2020 Base Plans:***<br>Continue additional ground and flight test of the CH-53K GTV, EDMs and their associated subsystems and components in preparation of IOT&E. Continue to evaluate and implement producability, reliability and capability improvements during fabrication and assembly of System Demonstration Test Articles.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase from FY 2019 to FY 2020 in the Air Vehicle Development line is in direct support of the System Development and Demonstration Aircraft (SDD) and Test Program to continue flight test and correction of deficiencies in preparation of IOT&E and to achieve IOC in FY 2021. | | | | | |
| ***Title:*** Integrated Logistics Support and Test & Evaluation (T&E) | 0.000 | 33.902 | 39.198 | 0.000 | 39.198 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to perform in-house, field activity and contractor execution of Integrated Logistic Support and Developmental Test program. Continue to refine and validate Product Support Packages and Supportability Test Plans in preparation of IOT&E. Continue component qualification, Government ground and flight test activities, as well as LFT&E efforts.<br>***FY 2020 Base Plans:***<br>Continue to perform in-house, field activity and contractor execution of Integrated Logistic Support and Developmental Test program. Continue to refine and validate Product Support Packages and Supportability Test Plans in preparation of IOT&E. Continue component qualification, Government ground and flight test activities, as well as LFT&E efforts.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The increase from FY19 to FY20 includes Live Fire Test and Evaluation (LFT&E) funds in support of the Survivability KPP and required for FRP. FY20 LFT&E efforts are conducting test article set up and execution of live fire tests. FY20 Integrated Logistics Support, and T&E funding to NAWCAD and WD, supports the prime contractor (SDD/SDTA) schedule for additional flight test/hours and associated assets in support of test activities of IOT&E and to achieve IOC in FY21. | | | | | |
| ***Title:*** Systems Engineering & Project Management | 0.000 | 14.398 | 20.334 | 0.000 | 20.334 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to perform in-house, field activity and contractor execution of test program Integrated Product Teams. Continue to plan for, and execute, Correction of Deficiencies identified during component qualification and flight test. Efforts include engineering, program management and test program travel. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue to perform in-house, field activity and contractor execution of test program Integrated Product Teams. Continue to plan for, and execute, Correction of Deficiencies identified during component qualification and flight test. Efforts include engineering, program management and test program travel. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase from FY19 to FY20 in the Systems Engineering and Project Management is in direct support of the SDD Aircraft Systems Engineering and correction of deficiencies in preparation of IOT&E and to achieve IOC in FY21. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 326.945 | 516.955 | 0.000 | 516.955 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN / 0158 / 0158C: *CH-53K (Heavy Lift)* | 949.651 | 1,168.678 | 1,022.890 | - | 1,022.890 | 1,667.124 | 2,254.425 | 2,187.746 | 2,332.634 | 11,551.227 | 23,592.126 |
| • APN / 0605: *CH-53K - Initial Spares* | 77.103 | 59.040 | 98.824 | - | 98.824 | 72.087 | 34.466 | 14.961 | 16.729 | Continuing | Continuing |
| • APN / 0528: *H-53 Series* | 0.000 | 19.032 | 23.075 | - | 23.075 | 20.206 | 28.571 | 33.254 | 19.972 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

APN/0158/0158C: CH-53K Advanced and Regular Procurement (APN-1)
APN/0605: CH-53K Spares (APN-6)
APN/0528: CH-53K OSIP #s 007-19 Correction of Deficiencies and 008-19 Production Upgrades

**D. Acquisition Strategy**

On 31 October 2005, the Defense Acquisition Board (DAB) reviewed the CH-53K program for a Milestone (MS) B decision on entry to Systems Design and Development (SDD). The Under Secretary of the Defense for Acquisition, Technology and Logistics (USD AT&L) signed the Acquisition Decision Memorandum (ADM) allowing the program to proceed with SDD on 22 December 2005. The CH-53K program was initiated as an Acquisition Category 1D program, based on total estimated costs for Research, Development, Test and Evaluation and Aircraft Procurement, Navy. The SDD prime contract was awarded sole-source contract to Sikorsky Aircraft Corporation on 5 April, 2006, following the MS B decision. SDD efforts will develop and document technology maturations, selections, and integration into CH-53E design modifications for a new CH-53K variant; produce one CH-53K Ground Test Vehicle and four CH-53K Engineering Developmental Models; and conduct and support Test and Evaluation activities fulfilling milestone exit criteria. In FY13 the SDD contract was modified to include four System Demonstration Test Articles (SDTAs). In FY15 the SDD contract was modified to add the long-lead/critical parts for the two additional SDTA aircraft. The T408-GE-400 engines for SDTAs 1-4, which were converted from Contractor Furnished Equipment to Government Furnished Equipment, were placed on contract in FY14. Additionally, a contract option was exercised in FY15 to provide engines for SDTAs 5-6. On 30 March 2017, the DAB reviewed the CH-53K program for a MS C decision allowing entry into Production and the ADM was signed by USD AT&L on 4 April 2017 resulting in an ACAT 1C designation.

**E. Performance Metrics**

Since MS B, the program team has followed a disciplined, event-driven, design and development process. The program completed Preliminary Design Review in September 2008 and conducted Critical Design Review in July 2010. System meets or exceeds all Key Performance Parameters.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | Project (Number/Name)<br>3059 / *CH-53K Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development: SDD / SDTA Air Vehicle | SS/CPIF | Sikorsky : Stratford, CT | 0.000 | 0.000 | | 226.100 | Dec 2018 | 410.100 | Dec 2019 | - | | 410.100 | 0.000 | 636.200 | 757.534 |
| GFE: Engines | SS/CPFF | GE : Lynn, MA | 0.000 | 0.000 | | 6.338 | Jan 2019 | 6.300 | Jan 2020 | - | | 6.300 | 0.000 | 12.638 | 17.539 |
| Primary Hardware Development, Capability Improvement | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Primary Hardware Development:-Other SAC | TBD | Sikorsky : Stratford, CT | 0.000 | 0.000 | | 36.000 | Jan 2019 | 35.300 | Jan 2020 | - | | 35.300 | 0.000 | 71.300 | 71.300 |
| Primary Hardware Development | Various | Various : Various | 0.000 | 0.000 | | 10.207 | Apr 2019 | 5.723 | Apr 2020 | - | | 5.723 | 0.000 | 15.930 | 11.029 |
| | | **Subtotal** | 0.000 | 0.000 | | 278.645 | | 457.423 | | - | | 457.423 | Continuing | Continuing | N/A |

**Remarks**

FY20 funding increase is in direct support of the System Development and Demonstration Aircraft (SDD) test program to prepare for IOT&E and to achieve IOC in FY21. Government Furnished Equipment/Engines provides funding for SDTA Engine contract.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 1.150 | Dec 2018 | 1.173 | Dec 2019 | - | | 1.173 | 0.000 | 2.323 | - |
| Integrated Logistics Support | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 1.038 | Dec 2018 | 1.223 | Dec 2019 | - | | 1.223 | 0.000 | 2.261 | - |
| Integrated Logistics Support | WR | NADEP : Cherry Point, NC | 0.000 | 0.000 | | 1.325 | Dec 2018 | 1.352 | Dec 2019 | - | | 1.352 | 0.000 | 2.677 | - |
| Integrated Logistics Support-OLD PM CONTRACT | C/CPFF | GDIT : Fairfax, VA | 0.000 | 0.000 | | 1.900 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.900 | 1.900 |
| Integrated Logistics Support | WR | Various : Various | 0.000 | 0.000 | | 2.539 | Dec 2018 | 2.590 | Dec 2019 | - | | 2.590 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | NAWCTSD : Orlando, FL | 0.000 | 0.000 | | 0.750 | Dec 2018 | 0.250 | Dec 2019 | - | | 0.250 | 0.000 | 1.000 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | Project (Number/Name)<br>3059 / *CH-53K Development* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Spt-NEW PM CONTRACT | C/CPFF | NSI : Lexington Park, MD | 0.000 | 0.000 | | 0.000 | | 1.610 | Apr 2020 | - | | 1.610 | 0.000 | 1.610 | 1.610 |
| | | **Subtotal** | 0.000 | 0.000 | | 8.702 | | 8.198 | | - | | 8.198 | Continuing | Continuing | N/A |

**Remarks**

NAWC TSD training systems previously captured under "Integrated Logistic Support - Various" are now contained in the Government Engineering support line.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Various : Various | 0.000 | 0.000 | | 0.600 | Dec 2018 | 1.100 | Dec 2019 | - | | 1.100 | 0.000 | 1.700 | - |
| Developmental Test & Evaluation | WR | NAWCAD : Pax River, MD | 0.000 | 0.000 | | 22.500 | Dec 2018 | 23.400 | Nov 2019 | - | | 23.400 | 0.000 | 45.900 | - |
| Operational Test & Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 0.000 | 0.000 | | 1.100 | Dec 2018 | 1.500 | Dec 2019 | - | | 1.500 | 0.000 | 2.600 | - |
| Live Fire Test & Evaluation | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 1.000 | Dec 2018 | 5.000 | Dec 2019 | - | | 5.000 | 0.000 | 6.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 25.200 | | 31.000 | | - | | 31.000 | 0.000 | 56.200 | N/A |

**Remarks**

FY20 Live Fire Test and Evaluation funds are in support of the Survivability KPP and required for FRP. FY20 efforts are conducting test article set up and execution of live fire tests. Increase of FY20 T&E funding to NAWCAD and WD supports the prime contractor (SDD/SDTA) schedule for additional flight test/hours and associated assets in support of test activities of IOT&E and to achieve IOC in FY21.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | Various | Various : Various | 0.000 | 0.000 | | 2.848 | Dec 2018 | 2.905 | Dec 2019 | - | | 2.905 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | Project (Number/Name)<br>3059 / *CH-53K Development* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 0.000 | 0.000 | | 8.399 | Dec 2018 | 14.270 | Nov 2019 | - | | 14.270 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | Zenetix : Herndon, VA | 0.000 | 0.000 | | 2.208 | Jan 2019 | 2.195 | Jan 2020 | - | | 2.195 | 3.110 | 7.513 | 7.513 |
| Program Management Support | Various | Various : Various | 0.000 | 0.000 | | 0.833 | Dec 2018 | 0.850 | Dec 2019 | - | | 0.850 | Continuing | Continuing | Continuing |
| Travel | WR | NAWCAD : Pax River, MD | 0.000 | 0.000 | | 0.110 | Dec 2018 | 0.114 | Nov 2019 | - | | 0.114 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 14.398 | | 20.334 | | - | | 20.334 | Continuing | Continuing | N/A |

**Remarks**

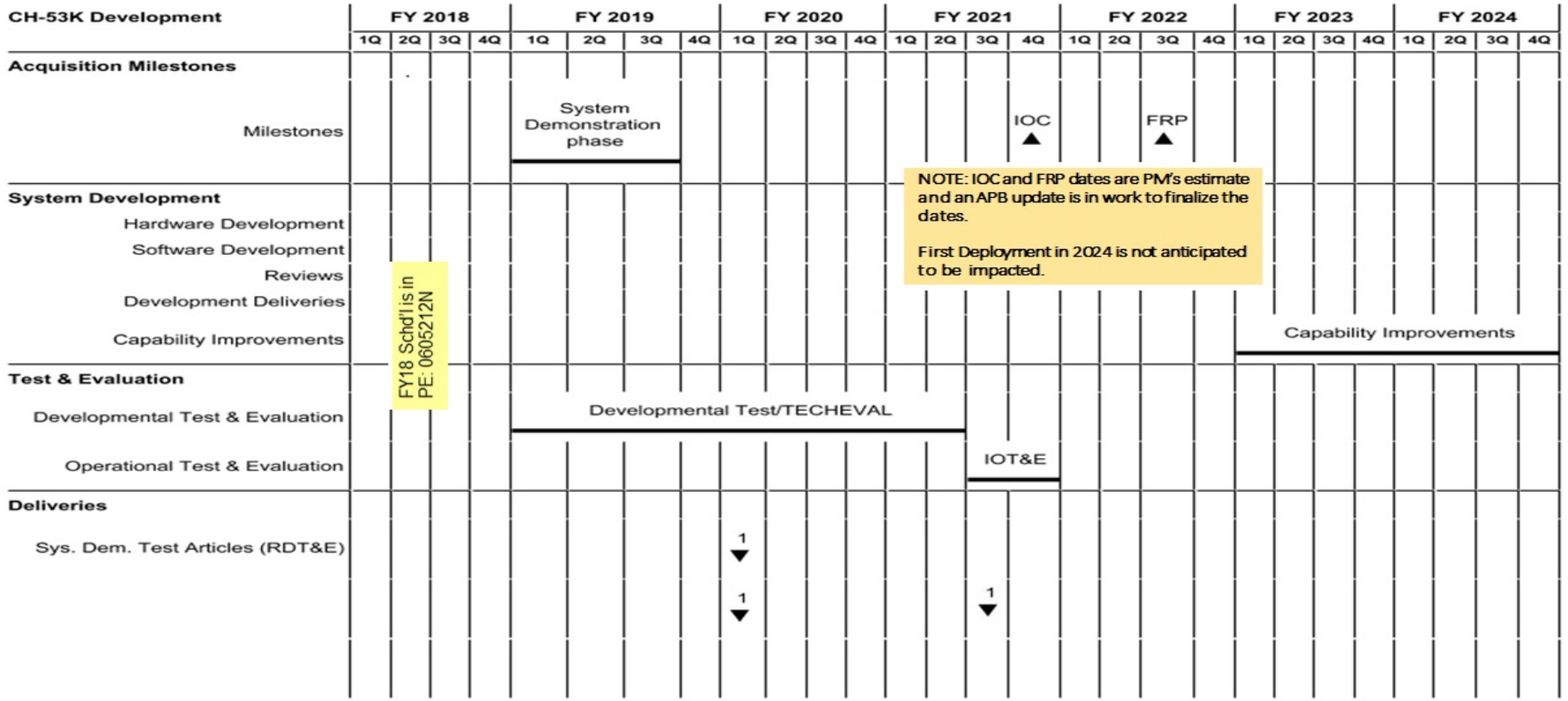
Increase of FY20 Gov't Eng support is required for the additional in house activities to include program management and engineering support for the Integrated Product teams in preparation of IOT&E and to achieve IOC in FY21.

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 326.945 | | 516.955 | | - | | 516.955 | Continuing | Continuing | N/A |

**Remarks**

Items with continuing in CTC (FY's 23 and beyond) are not part of the ACAT 1C program. Primary Hardware Development Capability Improvement will support efforts beyond the FYDP.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

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Schedule reflects proposed plan as cited on the R2; as such, SDTA 5 & 6 deliveries have been removed

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

| CH-53K Development | FY 2018 | | | | FY2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q | 1Q | 2Q | 3Q | 4Q |
| **Production Milestones (0158):** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Production LRIP Awards | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LRIP 2 | | | | | | | 6 | | | | | | | | | | | | | | | | | | | | | |
| LRIP 3 | | | | | | | 8 | | | | | | | | | | | | | | | | | | | | | |
| LRIP 4 | | | | | | | | | | 6 | | | | | | | | | | | | | | | | | | |
| LOT 5 | | | | | | | | | | | | | 12 | | | | | | | | | | | | | | | |
| LOT 6 | | | | | | | | | | | | | | | | | 19 | | | | | | | | | | | |
| LOT 7 | | | | | | | | | | | | | | | | | | | | | 18 | | | | | | | |
| LOT 8 | | | | | | | | | | | | | | | | | | | | | | | | | 19 | | | |
| Production LRIP Deliveries | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | 1 | 2 | 2 | 1 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 1 | 2 | 2 | 2 | 1 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | 1 | 4 | 1 | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 5 | 4 | 1 |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***CH-53K Development*** | | | | |
| Acquisition Milestones: Milestones: System Demonstration phase | 1 | 2019 | 3 | 2019 |
| Acquisition Milestones: Milestones: Initial Operational Capability | 4 | 2021 | 4 | 2021 |
| Acquisition Milestones: Milestones: Full Rate Production | 3 | 2022 | 3 | 2022 |
| System Development: Capability Improvements: Capability Improvements | 1 | 2023 | 4 | 2024 |
| Test & Evaluation: Developmental Test & Evaluation: Developmental Test / Operational Test - IT | 1 | 2019 | 2 | 2021 |
| Test & Evaluation: Operational Test & Evaluation: IOT&E | 3 | 2021 | 4 | 2021 |
| Deliveries: Sys. Dem. Test Articles (RDT&E): System Demonstration Test Articles (SDTA) #2 | 1 | 2020 | 1 | 2020 |
| Deliveries: Sys. Dem. Test Articles (RDT&E): System Demonstration Test Articles (SDTA) #4 | 1 | 2020 | 1 | 2020 |
| Deliveries: Sys. Dem. Test Articles (RDT&E): System Demonstration Test Articles (SDTA) #1 | 3 | 2021 | 3 | 2021 |
| Deliveries: Production Delivery: Aircraft 1 | 4 | 2020 | 4 | 2020 |
| Deliveries: Production Delivery: Aircraft 2 | 1 | 2021 | 1 | 2021 |
| Deliveries: Production Delivery: Aircraft 3 | 4 | 2021 | 4 | 2021 |
| Deliveries: Production Delivery: Aircraft 4 | 1 | 2022 | 1 | 2022 |
| Deliveries: Production Delivery: Aircraft 5 | 1 | 2022 | 1 | 2022 |
| Deliveries: Production Delivery: Aircraft 6 | 2 | 2022 | 2 | 2022 |
| Deliveries: Production Delivery: Aircraft 7 | 2 | 2022 | 2 | 2022 |
| Deliveries: Production Delivery: Aircraft 8 | 3 | 2022 | 3 | 2022 |
| Deliveries: Production Delivery: Aircraft 9 | 3 | 2022 | 3 | 2022 |
| Deliveries: Production Delivery: Aircraft 10 | 4 | 2022 | 4 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deliveries: Production Delivery: Aircraft 11 | 4 | 2022 | 4 | 2022 |
| Deliveries: Production Delivery: Aircraft 12 | 1 | 2023 | 1 | 2023 |
| Deliveries: Production Delivery: Aircraft 13 | 1 | 2023 | 1 | 2023 |
| Deliveries: Production Delivery: Aircraft 14 | 2 | 2023 | 2 | 2023 |
| Deliveries: Production Delivery: Aircraft 15 | 2 | 2023 | 2 | 2023 |
| Deliveries: Production Delivery: Aircraft 16 | 3 | 2023 | 3 | 2023 |
| Deliveries: Production Delivery: Aircraft 17 | 3 | 2023 | 3 | 2023 |
| Deliveries: Production Delivery: Aircraft 18 | 4 | 2023 | 4 | 2023 |
| Deliveries: Production Delivery: Aircraft 19 | 4 | 2023 | 4 | 2023 |
| Deliveries: Production Delivery: Aircraft 20 | 4 | 2023 | 4 | 2023 |
| Deliveries: Production Delivery: Aircraft 21 | 4 | 2023 | 4 | 2023 |
| Deliveries: Production Delivery: Aircraft 22 | 1 | 2024 | 1 | 2024 |
| Deliveries: Production Delivery: Aircraft 23 | 1 | 2024 | 1 | 2024 |
| Deliveries: Production Delivery: Aircraft 24 | 1 | 2024 | 1 | 2024 |
| Deliveries: Production Delivery: Aircraft 25 | 2 | 2024 | 2 | 2024 |
| Deliveries: Production Delivery: Aircraft 26 | 2 | 2024 | 2 | 2024 |
| Deliveries: Production Delivery: Aircraft 27 | 2 | 2024 | 2 | 2024 |
| Deliveries: Production Delivery: Aircraft 28 | 2 | 2024 | 2 | 2024 |
| Deliveries: Production Delivery: Aircraft 29 | 2 | 2024 | 2 | 2024 |
| Deliveries: Production Delivery: Aircraft 30 | 3 | 2024 | 3 | 2024 |
| Deliveries: Production Delivery: Aircraft 31 | 3 | 2024 | 3 | 2024 |
| Deliveries: Production Delivery: Aircraft 32 | 3 | 2024 | 3 | 2024 |
| Deliveries: Production Delivery: Aircraft 33 | 3 | 2024 | 3 | 2024 |
| Deliveries: Production Delivery: Aircraft 34 | 3 | 2019 | 3 | 2019 |
| Deliveries: Production LRIP Awards: LRIP 2 | 3 | 2019 | 3 | 2019 |
| Deliveries: Production LRIP Awards: LRIP 3 | 3 | 2019 | 3 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deliveries: Production LRIP Awards: LRIP 4 | 2 | 2020 | 2 | 2020 |
| Deliveries: Production LRIP Awards: Lot 5 | 2 | 2021 | 2 | 2021 |
| Deliveries: Production LRIP Awards: Lot 6 | 2 | 2022 | 2 | 2022 |
| Deliveries: Production LRIP Awards: Lot 7 | 2 | 2023 | 2 | 2023 |
| Deliveries: Production LRIP Awards: Lot 8 | 2 | 2024 | 2 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 10.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 10.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The CH-53 is the only marinized heavy-lift helicopter in the world and is the Marine Corps only heavy-lift helicopter. The CH-53 mission is the conduct of expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel to support distributed operations deep inland from a sea-based center of operations. The CH-53E "Super Stallion" was introduced into operations in 1980 as an upgrade version of the CH-53D. The CH-53E has developed performance degradation, fatigue life, interoperability, maintenance supportability, and other operational concerns. An improved CH-53 is needed to support Marine Air-Ground Task Force heavy-lift requirements in the 21st century joint environment. The CH-53K "King Stallion" will provide improvements in range and payload, performance, cargo handling, turn-around times, reliability and maintainability, interoperability, and survivability. The CH-53K program is required to provide full system capability, including shipboard compatibilities, at Initial Operational Capability (IOC).

The Wireless Intercommunication System (ICS) will enable the CH-53K crew the capability for simultaneous use, highly reliable, jam resistant, secure and non-secure voice communications in an electronic warfare environment.

The Common Lightweight Cargo Floor will provide an integrated flooring system solution which reduces aircraft weight and improves capability of the restraint locking system.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Wireless Intercom System<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Commence development of a Wireless Intercommunication System (ICS) which will enable crew capability for simultaneous use, highly reliable, jam resistant, secure and non-secure voice communications in an electronic warfare environment. | 0.000 | 5.000 |
| ***Congressional Add:*** Common Lightweight Cargo System<br>***FY 2018 Accomplishments:*** N/A<br>***FY 2019 Plans:*** Commence efforts for the Common Lightweight Cargo system which will provide an integrated flooring system solution which reduces aircraft weight and improves capability of the restraint locking system | 0.000 | 5.000 |
| **Congressional Adds Subtotals** | 0.000 | 10.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212M / *CH-53K* | Project (Number/Name)<br>9999 / *Congressional Adds* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Developmnet Common Lightweight Cargo | TBD | Sikorsky : Strafford, CT | 0.000 | 0.000 | | 5.000 | Aug 2019 | 0.000 | | - | | 0.000 | 0.000 | 5.000 | 5.000 |
| Product Developmenet Wireless Intercom System | TBD | Axnes : TBD | 0.000 | 0.000 | | 5.000 | May 2019 | 0.000 | | - | | 0.000 | 0.000 | 5.000 | 5.000 |
| | | **Subtotal** | 0.000 | 0.000 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | N/A |

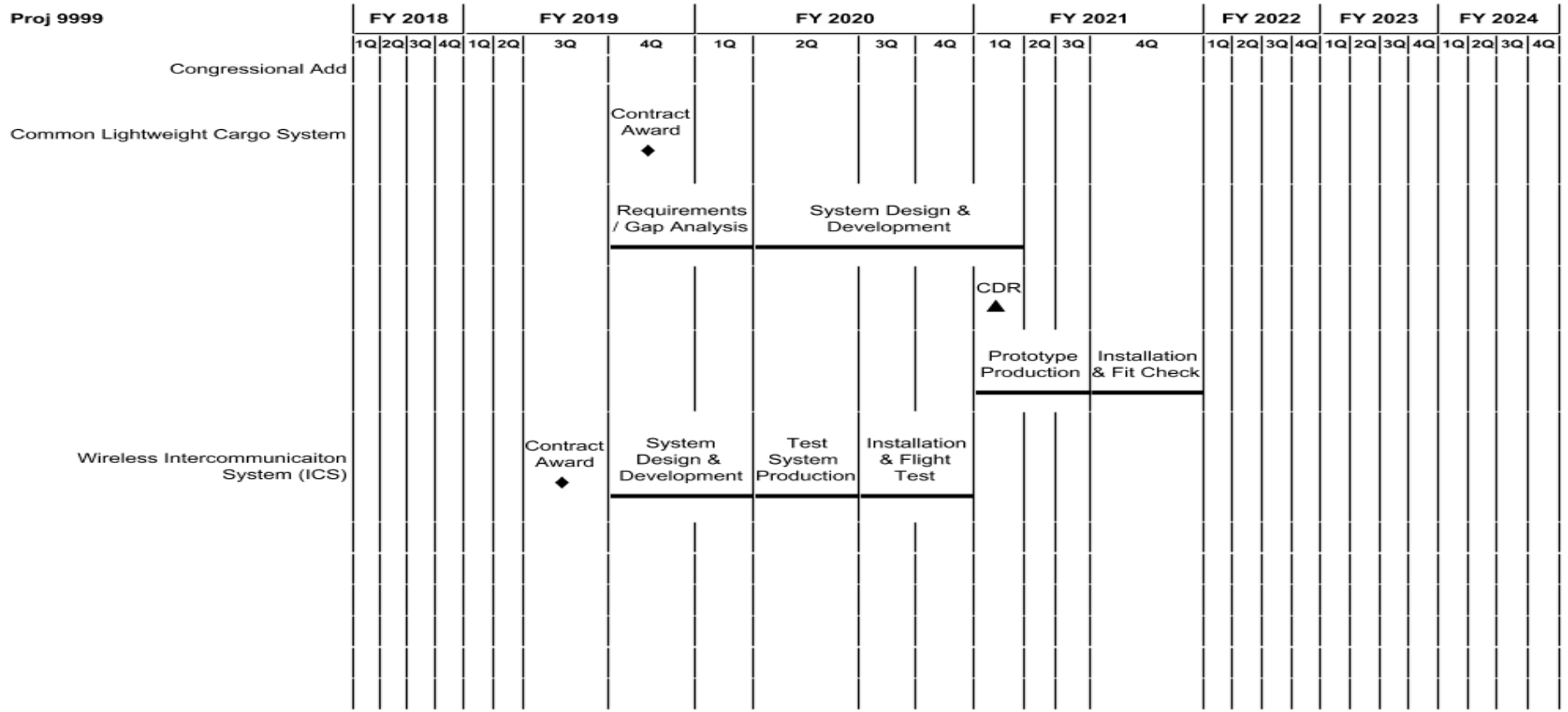
**Remarks**

FY19 CONGRESSIONAL ADD: The Common Lightweight Cargo System and Wireless Intercom System provides new and improved capability to the CH53-K aircraft that support the overall Heavy-lift mission.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 10.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0605212M - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212M / *CH-53K* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Common Lightweight Cargo System: Contract Award | 4 | 2019 | 4 | 2019 |
| Common Lightweight Cargo System: Requirements / Gap Analysis | 4 | 2019 | 1 | 2020 |
| Common Lightweight Cargo System: System Design & Development | 2 | 2020 | 1 | 2021 |
| Common Lightweight Cargo System: Critical Deisgn Review | 1 | 2021 | 1 | 2021 |
| Common Lightweight Cargo System: Prototype Production | 1 | 2021 | 3 | 2021 |
| Common Lightweight Cargo System: Installation & Fit Check | 4 | 2021 | 4 | 2021 |
| Wireless Intercommunicaiton System (ICS): Contract Award | 3 | 2019 | 3 | 2019 |
| Wireless Intercommunicaiton System (ICS): System Design & Development | 4 | 2019 | 1 | 2020 |
| Wireless Intercommunicaiton System (ICS): Test System Production | 2 | 2020 | 2 | 2020 |
| Wireless Intercommunicaiton System (ICS): Installation & Flight Test | 3 | 2020 | 4 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605212N / *CH-53K* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 5,714.569 | 329.367 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 6,043.936 |
| 3059: *CH-53K Development* | 5,714.569 | 329.367 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 6,043.936 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 390 | | | | | | | | | | | | |

**Note**

Funds decrease from FY 2018 to FY 2019 due to transfer of effort to new PE 0605212M beginning in FY 2019.

**A. Mission Description and Budget Item Justification**

The CH-53 is the only marinized heavy-lift helicopter in the world and is the Marine Corps only heavy-lift helicopter. The CH-53 mission is the conduct of expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel to support distributed operations deep inland from a sea-based center of operations. The CH-53E "Super Stallion" was introduced into operations in 1980 as an upgrade version of the CH-53D. The CH-53E has developed performance degradation, fatigue life, interoperability, maintenance supportability, and other operational concerns. An improved CH-53 is needed to support Marine Air-Ground Task Force heavy-lift requirements in the 21st century joint environment. The CH-53K "King Stallion" will provide improvements in range and payload, performance, cargo handling, turn-around times, reliability and maintainability, interoperability, and survivability. The CH-53K program is required to provide full system capability, including shipboard compatibilities, at Initial Operational Capability (IOC).

Total aircraft quantities for the CH-53K program are 205 helicopters. This currently includes one Ground Test Vehicle (GTV) and four Engineering Development Models (EDMs) for System Development and Demonstration (SDD) purchased with Research, Development, Test & Evaluation (RDT&E) funds. Of the remaining 200 aircraft, six were System Demonstration Test Articles (SDTAs) and are incrementally funded using RDT&E funds and 194 aircraft are funded with Aircraft Procurement, Navy (APN). The SDTAs will be used to prove out production and integration processes on a pilot production line, and to provide aircraft for Initial Operational Test and Evaluation. Development contract overruns resulted in insufficient funding levels to continue work on SDTA 5&6 and the contract was modified to avoid further expenditure. The program will discontinue SDTA 5&6 efforts and DD-250 SDTA 5&6 parts to become Government property. Only SDTA 1-4 will remain to be utilized as previously planned. The program of record of aircraft quantity remains 200, four of which are SDTA and 196 aircraft to be APN funded. The proposed plan has been provided during the Above Threshold Reprogramming briefings/discussions, Requests for Information responses, and will be footnoted in the Selected Acquisition Report.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0605212N / *CH-53K* | | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 340.758 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 329.367 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -11.391 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -11.391 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.000 | - | 0.000 |

**Change Summary Explanation**

Funds decrease from FY 2018 to FY 2019 due to transfer of effort to new PE 0605212M beginning in FY 2019.

Technical: N/A

Schedule: N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0605212N / *CH-53K* | | | | Project (Number/Name)<br>3059 / *CH-53K Development* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 3059: *CH-53K Development* | 5,714.569 | 329.367 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 6,043.936 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 390

**Note**

FY19 and beyond are realigned under PE 0605212M / CH-53K. FY18 ends efforts under this PE 0605212N.

**A. Mission Description and Budget Item Justification**

The CH-53 is the only marinized heavy-lift helicopter in the world and is the Marine Corps only heavy-lift helicopter. The CH-53 mission is the conduct of expeditionary heavy-lift assault transport of armored vehicles, equipment and personnel to support distributed operations deep inland from a sea-based center of operations. The CH-53E "Super Stallion" was introduced into operations in 1980 as an upgrade version of the CH-53D. The CH-53E has developed performance degradation, fatigue life, interoperability, maintenance supportability, and other operational concerns. An improved CH-53 is needed to support Marine Air-Ground Task Force heavy-lift requirements in the 21st century joint environment. The CH-53K "King Stallion" will provide improvements in range and payload, performance, cargo handling, turn-around times, reliability and maintainability, interoperability, and survivability. The CH-53K program is required to provide full system capability, including shipboard compatibilities, at Initial Operational Capability (IOC).

Total aircraft quantities for the CH-53K program are 205 helicopters. This currently includes one Ground Test Vehicle (GTV) and four Engineering Development Models (EDMs) for System Development and Demonstration (SDD), are purchased with Research, Development, Test & Evaluation (RDT&E) funds. Of the remaining 200 aircraft, six were System Demonstration Test Articles (SDTAs) and are incrementally funded using RDT&E funds and 194 aircraft funded with Aircraft Procurement, Navy (APN). The SDTAs will be used to prove out production and integration processes on a pilot production line, and to provide aircraft for Initial Operational Test and Evaluation. Development contract overruns resulted in insufficient funding levels to continue work on SDTA 5&6 and the contract was modified to pause further expenditure. In order to minimize RDT&E funding shortfalls, the program will discontinue SDTA 5&6 efforts and DD-250 SDTA 5 & 6 parts to become Government property and provide these arts to the production line to make use of the parts to the Government's benefit. Only SDTA 1-4 will remain to be utilized as previously planned. The program of record of aircraft quantity remains at 200 with the remaining 196 aircraft to be APN funded. The proposed plan has been provided during the Above Threshold Reprogramming briefings/discussions, Requests for Information responses, and will be footnoted in the Selected Acquisition Report.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Air Vehicle Development | 260.485 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY19 and beyond are realigned under PE 0605212M / CH-53K. FY18 ends efforts under this PE 0605212N. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212N / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Integrated Logistics Support and Test & Evaluation (T&E)<br>***Articles:***<br>***FY 2019 Plans:***<br>FY19 and beyond are realigned under PE 0605212M / CH-53K. FY18 ends efforts under this PE 0605212N.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 43.971<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Systems Engineering & Project Management<br>***Articles:***<br>***FY 2019 Plans:***<br>FY19 and beyond are realigned under PE 0605212M / CH-53K. FY18 ends efforts under this PE 0605212N.<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 24.911<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| **Accomplishments/Planned Programs Subtotals** | 329.367 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN / 0158 / 0158C: *CH-53K (Heavy Lift)* | 949.651 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1,407.402 |
| • APN / 0605: *CH-53K - Initial Spares* | 77.103 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 77.103 |

**Remarks**

PB-19 Realigned the CH-53K Development Efforts from PE 0605212N/CH-53K to this PE 0605212M/CH-53K.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212N / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FY19 and beyond is captured in PE0605212M/CH-53K | | | | | | | | | | | |
| APN/0158/0158C: CH-53K Advanced and Regular Procurement (APN-1) | | | | | | | | | | | |
| APN/0605: CH-53K Spares (APN-6) | | | | | | | | | | | |

**D. Acquisition Strategy**

On 31 October 2005, the Defense Acquisition Board (DAB) reviewed the CH-53K program for a Milestone (MS) B decision on entry to Systems Design and Development (SDD). The Under Secretary of the Defense for Acquisition, Technology and Logistics (USD AT&L) signed the Acquisition Decision Memorandum (ADM) allowing the program to proceed with SDD on 22 December 2005. The CH-53K program was initiated as an Acquisition Category 1D program, based on total estimated costs for Research, Development, Test and Evaluation and Aircraft Procurement, Navy. The SDD prime contract was awarded sole-source contract to Sikorsky Aircraft Corporation on 5 April, 2006, following the MS B decision. SDD efforts will develop and document technology maturations, selections, and integration into CH-53E design modifications for a new CH-53K variant; produce one CH-53K Ground Test Vehicle and four CH-53K Engineering Developmental Models; and conduct and support Test and Evaluation activities fulfilling milestone exit criteria. In FY13 the SDD contract was modified to include four System Demonstration Test Articles (SDTAs). In FY15 the SDD contract was modified to add the long-lead/critical parts for the two additional SDTA aircraft. The T408-GE-400 engines for SDTAs 1-4, which were converted from Contractor Furnished Equipment to Government Furnished Equipment, were placed on contract in FY14. Additionally, a contract option was exercised in FY15 to provide engines for SDTAs 5-6. On 30 March 2017, the DAB reviewed the CH-53K program for a MS C decision allowing entry into Production and the ADM was signed by USD AT&L on 4 April 2017.

**E. Performance Metrics**

Since MS B, the program team has followed a disciplined, event-driven, design and development process. The program completed Preliminary Design Review in September 2008 and conducted Critical Design Review in July 2010. System meets or exceeds all Key Performance Parameters.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212N / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development: | SS/CPIF | Sikorsky : Stratford, CT | 4,490.324 | 244.606 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4,734.930 | 4,734.930 |
| Ancillary Hardware Development: DECM | SS/CPFF | Northrup Grumman : Falls Church, VA | 26.361 | 7.679 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 34.040 | 34.040 |
| GFE: Various | Various | Various : Various | 66.217 | 1.200 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 67.417 | 67.417 |
| GFE: Engines | SS/CPFF | GE : Lynn, MA | 129.661 | 7.000 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 136.661 | 136.661 |
| Incentive Fees | SS/CPIF | Sikorsky : Stratford, CT | 73.383 | 0.000 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 73.383 | 73.383 |
| RAA: JUONS-S0-0010 (DAIRCM) | TBD | Various : Various | 53.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 53.000 | 53.000 |
| Prior year Prod Dev cost no longer funded in the FYDP | Various | Various : Various | 73.400 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 73.400 | 73.400 |
| | | **Subtotal** | 4,912.346 | 260.485 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5,172.831 | N/A |

**Remarks**

Primary Hardware Development Target Value of Contract includes System Demonstration Test Articles (SDTAs).
Ancillary Hardware Development provides funding for Defensive Electronic Countermeasures (DECM) contract.
GFE:Engines provides funding for SDTA engine contract.
FY17-18 Incentive Fees are a contractual requirement as potential schedule incentives based on continued progress of the SDTA aircraft.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | Various | NAWCAD : Lakehurst, NJ | 9.248 | 1.360 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.608 | - |
| Integrated Logistics Support | WR | NAWCAD : Lakehurst, NJ | 23.622 | 1.200 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.822 | - |
| Integrated Logistics Support | WR | NADEP : Cherry Point, NC | 19.116 | 1.458 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.574 | - |
| Integrated Logistics Support | C/CPFF | GDIT : Fairfax, VA | 20.673 | 1.960 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 22.633 | 22.633 |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605212N / *CH-53K* | Project (Number/Name)<br>3059 / *CH-53K Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | Various : Various | 39.420 | 1.792 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.212 | - |
| Government Engineering Support | WR | NAWCTSD : Orlando, FL | 9.323 | 2.257 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.580 | - |
| Studies & Analyses | WR | NSWC : Crane, IN | 3.500 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.500 | - |
| Studies & Analyses | Various | Various : Various | 22.127 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 22.127 | - |
| | | **Subtotal** | 147.029 | 10.027 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 157.056 | N/A |

**Remarks**

NAWC TSD training systems previously captured under "Integrated Logistic Support - Various" are now contained in the Government Engineering support line.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Various : Various | 30.884 | 1.500 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.384 | - |
| Developmental Test & Evaluation | WR | NAWCAD : Pax River, MD | 99.348 | 27.945 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 127.293 | - |
| Operational Test & Evaluation | WR | COMPTEVFOR : Norfolk, VA | 4.827 | 1.099 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.926 | - |
| Live Fire Test & Evaluation | WR | NAWCWD : China Lake, CA | 16.440 | 3.400 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.840 | - |
| | | **Subtotal** | 151.499 | 33.944 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 185.443 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | Various | Various : Various | 29.927 | 3.500 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.427 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212N / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | NAWCAD : Pax River, MD | 347.122 | 17.542 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 364.664 | - |
| Program Management Support | C/CPFF | Camber : Huntsville, AL | 41.708 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.708 | 41.708 |
| Program Management Support | C/CPFF | Zenetix : Herndon, VA | 16.729 | 2.744 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 19.473 | 19.473 |
| Program Management Support | Various | Various : Various | 62.091 | 1.000 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 63.091 | - |
| Travel | WR | NAWCAD : Pax River, MD | 4.168 | 0.125 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.293 | - |
| Prior year Mgmt cost no longer funded in the FYDP | Various | Various : Various | 1.950 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.950 | - |
| | | **Subtotal** | 503.695 | 24.911 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 528.606 | N/A |

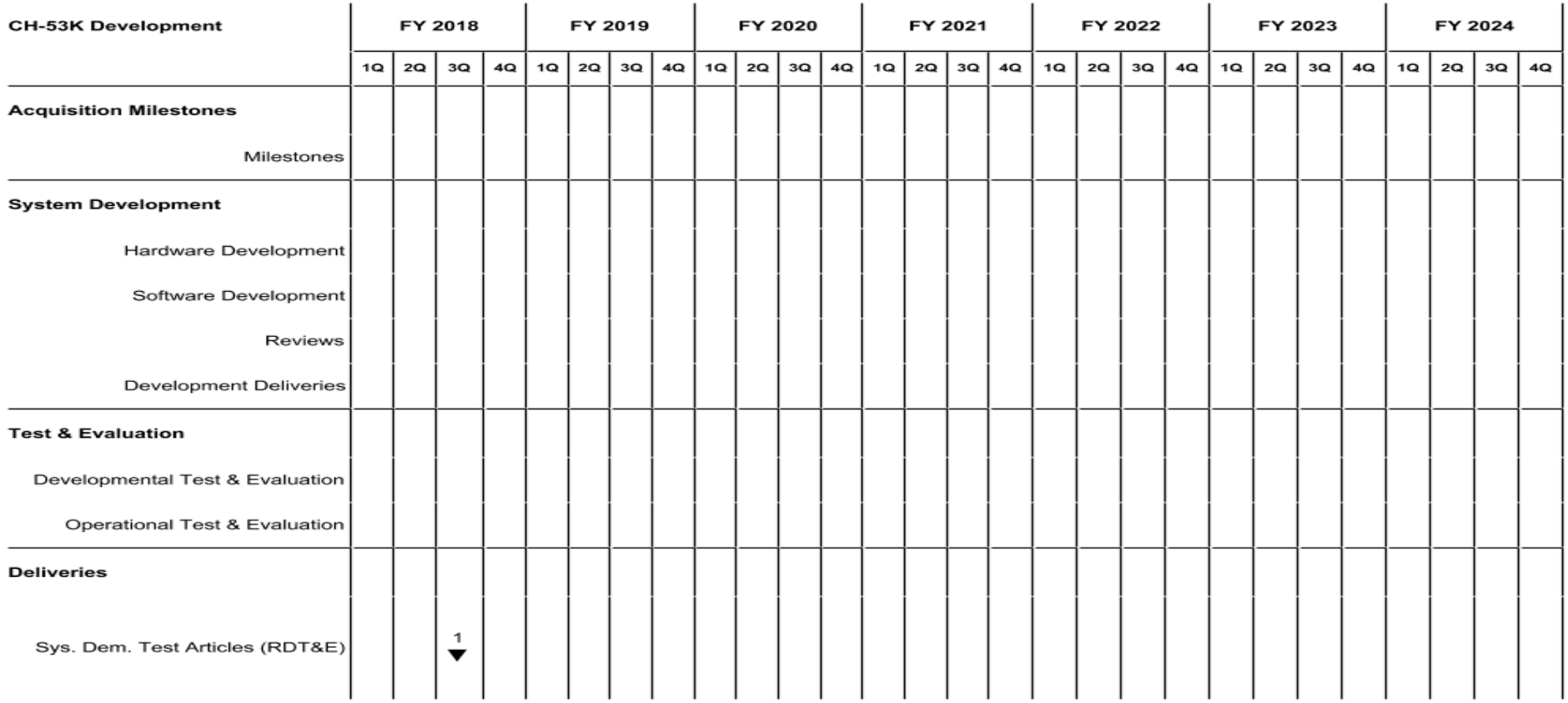
**Remarks**

Management Services requirements continue to decrease FY17-18 as both Government and Contractor support transitions to the CH-53K Production program.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 5,714.569 | 329.367 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6,043.936 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212N / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |




*2020PB - 0605212N - 3059*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605212N / *CH-53K* | **Project (Number/Name)**<br>3059 / *CH-53K Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***CH-53K Development*** | | | | |
| Acquisition Milestones: Milestones: Milestone C | 3 | 2017 | 3 | 2017 |
| Deliveries: Sys. Dem. Test Articles (RDT&E): System Demonstration Test Articles (SDTA) #3 | 3 | 2018 | 3 | 2018 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605215N *I (U)Mission Planning* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 32.876 | 36.108 | 32.714 | 75.886 | - | 75.886 | 86.886 | 79.731 | 62.218 | 40.786 | Continuing | Continuing |
| 2213: *Mission Planning* | 21.415 | 21.210 | 21.868 | 64.603 | - | 64.603 | 75.457 | 68.205 | 50.448 | 28.779 | Continuing | Continuing |
| 2311: *Stores Planning and Weaponeering Module* | 10.847 | 10.868 | 10.846 | 11.283 | - | 11.283 | 11.429 | 11.526 | 11.770 | 12.007 | Continuing | Continuing |
| 2312: *Common Helicopters* | 0.614 | 0.650 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.264 |
| 9999: *Congressional Adds* | 0.000 | 3.380 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.380 |

**A. Mission Description and Budget Item Justification**

The Mission Planning PE is used to develop automated mission planning systems to support Naval Aviation.

The Joint Mission Planning System (JMPS) (Proj 2213) is the designated automated mission planning system for the Navy, supporting over 40 Type/Model/Series (T/M/S) of U.S. Navy and Marine Corps aircraft and expeditionary forces. JMPS-M (Maritime) enables weapon system employment by providing the information, automated tools, and decision aids needed to rapidly plan aircraft, weapon, or sensor missions, load mission data into aircraft and weapons, conduct mission rehearsal, execute missions, and conduct post-mission analysis. JMPS-E (Expeditionary) is a scalable, tailorable, and collaborative web-based mission planning and execution monitoring tool for Amphibious Squadron (PHIBRON) staffs embarked with each Amphibious Ready Group (ARG) and Expeditionary Strike Group (ESG). Electronic Kneeboard (EKB) is a mobile device configured with various software applications and features to support aircrew during pre-flight planning, in-flight re-planning and mission execution, and post-mission debriefing and analysis. Common Munitions BIT/Reprogramming Equipment (CMBRE) (Proj 2213) provides USN/USMC forces the critical capability to perform built-in test and programming/reprogramming of various weapons. FY 2020 and out includes funding for the research and the development in order to develop upgrades to the CMBRE system to support advanced operational capabilities, address system obsolescence, meet cyber security requirements, and meet mission readiness requirements.

The Next Generation Naval Mission Planning System (NGNMPS) (Proj 2213) will address critical capability gaps and deficiencies in the legacy JMPS that are required for modern 21st century integrated mission-centric and collaborative multi-domain mission planning, execution and analysis. NGNMPS will replace Naval Aviation's legacy JMPS no later than 2027 while also affordably leveraging prior investments across the legacy systems to deliver integrated and collaborative capabilities. NGNMPS will affordably address technological obsolescence while also delivering collaborative and automated capabilities in an integrated virtual collaborative data environment. NGNMPS will also incorporate service-oriented architecture to provide revolutionary improvements in workflow, usability, cybersecurity, information and decision aids needed to rapidly plan/employ/maximize effectiveness of aircraft/weapon/sensor/payload mission plans; perform advanced pre-mission rehearsal/analysis; provide functionality to load mission data into aircraft and weapons; enable dynamic replanning/retargeting against evolving threats in contested environments; perform integrated and advanced post-mission debrief/analysis; support cross-domain capabilities; and support portability of mission planning, mission, execution, and mission analysis functions.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605215N *I (U)Mission Planning* |

The Stores Planning and Weaponeering Module, also referred to as Weaponeering and Stores Planning (WASP)(Proj 2311), is an integrated software product that allows aircrew to determine the best combinations of weapons and delivery conditions to achieve the desired level of target damage, eliminate weapon delivery solutions that violate aircraft T/M/S specific safety-of-flight envelopes, and perform detailed weapons employment planning for F/A-18 and E/A-18G aircraft. FY20 and out include funding for the research and development in order to integrate WASP with 3-D mission rehearsal, provide dynamic Safe Escape Automation Layer (SEAL) calculations on Electronic Kneeboard (EKB) SEAL, develop WASP for other Navy and Marine Corps platforms, and support WASP development and integration with Next Generation Mission Planning Systems (NGNMPS).

Common Helicopters (Proj 2213) is used to develop unique planning capabilities and tools for helicopters (e.g. Weight and Power Calculators (WPC), Common Mission Data Loader (CMDL), Weapon Employment Zone Overlays Tool (WEZOT) and Point Selection Tool (PST)) for integration into JMPS Mission Planning Environments (MPE). Starting in FY19, Common Helicopters RDT&E funding in PU 2312 was consolidated with JMPS-M Mission Planning funding in PU 2213.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under MISSION PLANNING because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 33.430 | 32.714 | 42.194 | - | 42.194 |
| Current President's Budget | 36.108 | 32.714 | 75.886 | - | 75.886 |
| Total Adjustments | 2.678 | 0.000 | 33.692 | - | 33.692 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.822 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 33.684 | - | 33.684 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.008 | - | 0.008 |
| • Congressional Add Adjustments | 3.500 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Planning and Execution Monitoring* | 3.380 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 3.380 | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605215N *I (U)Mission Planning* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| Congressional Add Totals for all Projects | 3.380 | 0.000 |

**Change Summary Explanation**

The FY 2020 funding request was increased by $33.7M in Proj 2213, to include funding for Next Generation Naval Mission Planning System (NGNMPS) Development (+$26.4M) and Next Generation Common Munitions BIT Reprogramming Equipment (CMBRE) (+$16.6M).

TECHNICAL:

Proj 2213:
Updated mission description, budget item justification and acquisition strategy to incorporate additional NGNMPS language.

Added additional sections to the R-2A to break out funding for NGNMPS. NGNMPS requirement analysis and Framework development were funded in FY 2018 and FY 2019 under the "Mission Planning Environment Program Mgmt, Integration, and Test" and "JMPS Framework (FW) and Common Components (CC) Development" respectively.

Added additional sections to the R-2A to break out funding for FY 2020, Next Generation CMBRE.

SCHEDULE:

Proj 2213:
Added Next Generation CMBRE development milestones, and Next Generation Naval Mission Planning System acquisition and software development milestones.

Proj 2311:
Changed WASP V4.1 completion of Systems Development and Test & Evaluation from 1Q 2020 to 2Q 2020. Added WASP V5.3 Systems Development, Test & Evaluation, and Production Milestones.

Proj 2312:
Common Helicopter efforts are consolidated under PU 2213 Mission Planning FY 2019 and out.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2213 / *Mission Planning* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2213: *Mission Planning* | 21.415 | 21.210 | 21.868 | 64.603 | - | 64.603 | 75.457 | 68.205 | 50.448 | 28.779 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

JMPS-Maritime (JMPS-M) is the designated automated mission planning system for naval aviation, supporting over 40 T/M/S of U.S. Navy and Marine Corps aircraft. JMPS-M enables weapon system employment by providing the information, automated tools, and decision aids needed to rapidly plan aircraft, weapon, or sensor missions, load mission data into aircraft and weapons, conduct mission rehearsal, and conduct post-mission analysis. JMPS-M is a mission critical system which is a co-development effort between the United States Navy (USN) and United States Air Force (USAF). Common requirements are identified and core JMPS-M capabilities are developed and prioritized in an evolutionary approach. An individual JMPS-M Mission Planning Environment (MPE) requires the JMPS framework, common components, unique planning components (UPCs), federated applications, and the necessary system hardware required to satisfy mission planning objectives. Most tactical naval aviation platforms are dependent solely on JMPS-M to plan precision guided munitions, sensor systems, tactical data links, secure voice communications, and basic Safety of Flight functions. Common helicopter functionality will be developed for implementation in Joint Mission Planning System (JMPS). Common Helicopter components include, Weight and Power Calculators (WPC), Common Mission Data Loader (CMDL), Weapon Employment Zone Overlays Tool (WEZOT) and Point Selection Tool (PST).

The Next Generation Naval Mission Planning System (NGNMPS) will address critical capability gaps and deficiencies in the legacy JMPS that are required for modern 21st century integrated mission-centric and collaborative multi-domain mission planning, execution and analysis. NGNMPS will replace Naval Aviation's legacy JMPS no later than 2027 while also affordably leveraging prior investments across the systems of systems to deliver integrated and collaborative capability. NGNMPS will affordably address technological obsolescence while also delivering collaborative and automated capabilities in an integrated virtual collaborative data environment. NGNMPS will also leverage service-oriented architecture to provide revolutionary improvements in workflow, usability, cybersecurity, information and decision aids needed to rapidly plan/employ/maximize effectiveness of aircraft/weapon/sensor/payload mission plans; perform advanced pre-mission rehearsal/analysis; provide functionality to load mission data into aircraft and weapons; enable dynamic replanning/retargeting against evolving threats in contested environments; perform integrated and advanced post-mission debrief/analysis; support cross-domain capabilities; and support portability of mission planning, mission, execution, and mission analysis functions.

FY 2020 and out includes funding for Common Munitions BIT/Reprogramming Equipment (CMBRE) which provides the USN/USMC the critical capability to perform built-in-test and programming/reprogramming of various weapons. Funding will provide research and the development in order to develop upgrades to the CMBRE system to support advanced operational capabilities, address system obsolescence, meet cyber security requirements, and meet mission readiness requirements.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Mission Planning Environment Program Mgmt, Integration, and Test | 12.374 | 12.687 | 12.368 | 0.000 | 12.368 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Mission Planning Environment (MPE) Integration and Test efforts support the Navy's developmental testing/operational testing, integration and system of system testing for MPE fielding, integrating, testing, and managing Electronic Kneeboard (EKB) efforts. Life-cycle management efforts consist of integration of components provided by various developers into a platform-centric MPE and testing of the integrated MPE. MPE integration and testing results in a consistent and repeatable system configuration that enables stability and reliability.<br><br>***FY 2019 Plans:***<br>Continue mission planning integration and testing, project management and system engineering for over 40 T/M/S to include fielding of Windows 10. Test and verify capabilities to support multi-ship mission coordination and update/validate fleet requirements in support of Next Generation Naval Mission Planning MPEs. Conduct integration and test of EKB to the fleet for functionality and cyber security mandates.<br><br>***FY 2020 Base Plans:***<br>Continue mission planning integration and testing, project management and system engineering for over 40 T/M/S that are supported by legacy JMPS and by the Next Generation Naval Mission Planning System. Test and verify capabilities to support multi-ship mission coordination and transition of components to 64 bit and/or services. Continue to update/validate fleet requirements in support of Next Generation Naval Mission Planning MPEs. Conduct integration and test of EKB to the fleet for functionality and cyber security mandates.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease of $0.319 million from FY 2019 to FY 2020 due to reduced MPE integration and test efforts. | | | | | |
| ***Title:*** Joint Mission Planning System Expeditionary (JMPS-E) | 0.946 | 0.953 | 1.005 | 0.000 | 1.005 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** JMPS Expeditionary (JMPS-E): JMPS-E provides a scalable, tailorable, mission planning and execution monitoring tool for Amphibious Squadron staffs. The primary focus of this system is to provide an automated capability to assist planners with mission analysis, course of action development and automated creation of doctrinal orders based on planning data in the system. JMPS-E provides a digital map enabling better response times to changing plans, easier distribution of planning artifacts and a reduction in human error during the planning process. The variety and geographically separated nature of forces involved with Ship to Objective Maneuver (STOM) amplifies the need for web-based technologies to enable collaborative planning, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| improve overall situational awareness and enable the monitoring of mission execution from different locations. The primary outputs are tasking orders, route plans, battlespace geometries and decision briefs. The system will also incorporate modeling and simulation tools to rehearse and deconflict mission plans.<br><br>***FY 2019 Plans:***<br>Field JMPS-E MPE Version 3.0. Begin development, integration and testing of JMPS-E MPE Version 4.0 which updates the JMPS-E UPC and required Common Components, Federated Applications, COTS and GOTS software products to maintain current capabilities and required cyber posture.<br><br>***FY 2020 Base Plans:***<br>Continue development, integration and testing of JMPS-E Version 4.0 which updates the required Common Components, Federated Applications, COTS and GOTS JMPS-E software products to transition legacy JMPS-E capabilities to the NGNMPS.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $0.052 million from FY 2019 to FY 2020 due to additional efforts required to support fielding and development of multiple JMPS-E versions (3.0 & 4.0). | | | | | |
| ***Title:*** Mission Planning Framework (FW) and Common Components (CC) Development | 7.890 | 8.228 | 8.230 | 0.000 | 8.230 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** As platform(s) requirements emerge for new and enhanced mission planning capabilities, the demand for more complex integrated applications and software products increases. The future transition to a modernized architecture will provide the volume of integrated mission planning capability that will be required by complex integrated combat operations. This task continues development and integration of modernized mission planning software frameworks which provide additional capabilities for all naval aircraft. Continue common component development. Framework development tasks include: system engineering processes, management interface controls, software architectural analysis, requirements management and a centralized website for Mission Planning Environment (MPE) developers. Common Components software updates in a modernized software environment will also augment core mission planning capabilities across multiple T/M/S. The JMPS FW and Common Components will also transition to Windows 10.<br><br>***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue co-development with the Air Force for modernized Frameworks. This effort will result in modernized mission planning frameworks remaining aligned with the Air Force for improved joint service affordability while also enhancing the systems cyber security. Continue development activities for NGNMPS framework which include implementing a modular, scalable architecture to support cyber security implementations for compliance with cyber mandates. Continue development and integration of common components to meet platform(s) requirements for new and enhanced mission planning capability required in a modernized environment. Integration activities will continue as platforms deliver modernized Unique Planning Capabilities and services for integration, testing and fielding.<br>***FY 2020 Base Plans:***<br>Continue development, integration and testing of modernized framework capabilities. Introduce Mission Planning Data Service Layer (MPDSL) capability involving new business services, utilities and data types as part of the Framework. Continue development activities for framework/architecture which include implementing a modular, scalable architecture to support cyber security implementations for compliance with cyber mandates. Continue development and integration of common components to meet platform(s) requirements for new and enhanced mission planning capability required in a modernized environment. Integration activities will continue as platforms deliver modernized unique planning capabilities for integration, testing and fielding.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase of $0.002 million from FY 2019 to FY 2020 due to the consolidation of Common Helicopter PU into this Mission Planning PU. | | | | | |
| ***Title:*** Next Generation Naval Mission Planning System (NGNMPS) Development | 0.000 | 0.000 | 26.400 | 0.000 | 26.400 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The Next Generation Naval Mission Planning System (NGNMPS) will address critical capability gaps and deficiencies in the legacy JMPS that are required for modern 21st century integrated mission-centric and multi-domain collaborative mission planning, execution and analysis. NGNMPS will replace Naval Aviation's legacy JMPS no later than 2027 while also affordably leveraging prior investments across the legacy systems to deliver integrated and collaborative capabilities. NGNMPS will affordably address technological obsolescence while also delivering collaborative and automated capabilities in an integrated virtual collaborative data environment. NGNMPS will also incorporate service-oriented architecture to provide revolutionary improvements in workflow, usability, cybersecurity, information and decision aids needed to rapidly plan/employ/maximize effectiveness of aircraft/weapon/sensor/payload mission plans; perform advanced pre- | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| mission rehearsal/analysis; provide functionality to load mission data into aircraft and weapons; enable dynamic replanning/retargeting against evolving threats in contested environments; provide integrated and advanced post-mission debrief/analysis; support cross-domain capabilities; and support portability of mission planning, mission, execution, and mission analysis functions. NGNMPS requirements and performance metrics are currently under development in FY 2018 and FY 2019 under "Mission Planning Environment Program Mgmt, Integration, and Test".<br><br>***FY 2019 Plans:***<br>N/A<br><br>***FY 2020 Base Plans:***<br>Conduct NGNMPS program software development, architecture integration, and test across a family of systems. Conduct software development of services and service-oriented architecture, including engineering design reviews. Conduct rapid prototyping and transition of enabling technologies in support of NGNMPS collaboration, automation and other requirements.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 funds the development for the Next Generation Naval Mission Planning System that modernizes aviation Mission Planning capability against the evolving contested threat including increased collaborative and integrated planning execution and analysis. | | | | | |
| ***Title:*** Next Generation Common Munitions BIT Reprogramming Equipment (CMBRE) | 0.000 | 0.000 | 16.600 | 0.000 | 16.600 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The technology inherent to the current CMBRE is obsolete and cannot be sustained beyond 2025. In addition to sustainability issues and security concerns, the Fleet requires a more transportable, lighter weight and rugged test set that has the ability to service existing and future weapons with increased data transfer capability in austere operating environments. CMBRE Next Generation efforts support the Navy's developmental testing/operational testing, fielding, integrating, and management. CMBRE Next Generation will enhance mission readiness and security, generate improved flexibility, depth and capacity for existing and emerging aviation weapon capabilities during the conduct of ship, shore, and ship-to-shore operations in both conventional and Distributed Aviation Operations environments. Required to support Next Generation Fleet requirements and CONOPS and to comply with Cyber security mandates and obsolescence issues. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Begin development and DT/OT of Next Generation CMBRE to support Navy/Marine requirements. Next Generation CMBRE will mitigate known cyber security and obsolescence issues.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Next Generation CMBRE development will be a new effort in FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 21.210 | 21.868 | 64.603 | 0.000 | 64.603 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2876: *Mission Planning* | 17.396 | 11.966 | 15.296 | - | 15.296 | 14.919 | 24.422 | 27.781 | 28.638 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The initial Joint Mission Planning System (JMPS) development effort was a phased evolutionary approach. JMPS is a post Milestone III program and Initial Operational Capability (IOC) occurred in December 2005. Cost Plus Award Fee (CPAF) and Cost Plus Incentive Fee (CPIF) contracts were awarded during initial development. During the down-select process, one contractor was selected to develop the JMPS architecture work and Version 1.0 basic flight planning components. Additional phases focused on strike planning requirements (i.e., support Precision Guided Missions and other tactical data intensive missions) in order to migrate platforms from legacy mission planning systems to JMPS. The USAF and USN continued the joint development of JMPS Frameworks via the USAF Mission Planning Enterprise Contract, which is used for JMPS Framework software development. The USN integration and fielding strategy supports a Mission Planning Environment (MPE) focus, where the JMPS Framework and other software components are integrated, tested, and fielded by T/M/S. As platforms plan their migration to newer versions of JMPS, the acquisition strategy, plan, and program baseline will be updated in order to divest legacy mission planning systems, meet the evolving requirements for integrated mission planning, and lower total life cycle cost. JMPS End of Life (EOL) is planned for 2027. This necessitates the development of a replacement system, Next Generation Naval Mission Planning System (NGNMPS).

NGNMPS will provide a modernized mission planning system which supports future multi-domain mission planning, execution, management, and mission analysis capabilities required by the 21st century warfighter. NGNMPS will address critical capability gaps and deficiencies in the legacy JMPS that are required for modern 21st century integrated mission-centric and multi-domain collaborative mission planning, execution and analysis. NGNMPS will replace Naval Aviation's legacy JMPS

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

no later than 2027 while also affordably leveraging prior investments across the systems of systems to deliver integrated and collaborative capability. NGNMPS will affordably address technological obsolescence while also delivering collaborative and automated capabilities in an integrated virtual collaborative data environment. NGNMPS will also leverage service-oriented architecture to provide revolutionary improvements in workflow, usability, cybersecurity, information and decision aids needed to rapidly plan/employ/maximize effectiveness of aircraft/weapon/sensor/payload mission plans; perform advanced pre-mission rehearsal/analysis; provide functionality to load mission data into aircraft and weapons; enable dynamic replanning/retargeting against evolving threats in contested environments; perform integrated and advanced post-mission debrief/analysis; support cross-domain capabilities; and support portability of mission planning, mission execution, and mission analysis functions.

NGNMPS will address shortfalls in the family of legacy systems (including JMPS) by modernizing the foundational software to a services based architecture that will improve composability of software applications to support mission planning, mission execution, and post-mission analysis. Adopting composable infrastructure whereby computing, storage and network elements are treated as individual services allows greater speed and flexibility when performing tasks, allows software applications to operate independently of a single hardware platform, and supports affordable component re-use across the family of systems.

**E. Performance Metrics**

JMPS Average time to plan a flight: Threshold value is < 1 hour average time to plan a flight that includes a Military Training Route (MTR), routing to and from the MTR, kneeboard card production, Instrument Flight Rules (IFR) flight planning materials and a Data Transfer Device (DTD) Load. Objective value is < 30 minutes average time to plan a flight that includes a MTR, routing to and from the MTR, kneeboard card production, IFR flight planning materials and a DTD Load.

JMPS Interoperability: Threshold value is 100% of top level Interoperability Exchange Requirements (IERs) designated critical will be satisfied. Objective value is 100% of top level IERs will be satisfied.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2213 / *Mission Planning* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Software Development/JMPS Expeditionary | C/CPFF | Leidos : Reston, VA | 0.400 | 0.298 | Feb 2018 | 0.302 | Feb 2019 | 0.308 | Feb 2020 | - | | 0.308 | Continuing | Continuing | Continuing |
| Primary Software Development/JMPS Expeditionary | C/CPAF | BAE : San Diego, CA | 0.000 | 0.568 | Mar 2018 | 0.569 | Mar 2019 | 0.613 | Mar 2020 | - | | 0.613 | Continuing | Continuing | Continuing |
| Primary Software Development, FW | C/CPFF | Northrop Grumman : Long Beach, CA | 4.500 | 0.230 | Feb 2018 | 0.240 | Feb 2019 | 0.245 | Feb 2020 | - | | 0.245 | Continuing | Continuing | Continuing |
| Primary Software Development/(Human Factors) | C/CPFF | Georgia Technical Research Institute (GTRI) : Atlanta, GA | 1.500 | 0.350 | Mar 2018 | 0.355 | Mar 2019 | 0.358 | Mar 2020 | - | | 0.358 | Continuing | Continuing | Continuing |
| Primary Software Development (SEIC) | C/CPFF | Leidos : Orlando, FL | 2.918 | 2.915 | Feb 2018 | 3.048 | Feb 2019 | 3.075 | Feb 2020 | - | | 3.075 | Continuing | Continuing | Continuing |
| Primary Software Development | C/CPFF | MTI : Park City, UT | 0.000 | 0.200 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.200 | - |
| Primary Software Development | C/CPFF | ATC : Eden Prairie, MN | 0.000 | 0.260 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.260 | - |
| Primary Software Development | C/CPFF | IDT : Arlington, VA | 0.000 | 0.760 | Jan 2018 | 0.783 | Jan 2019 | 0.785 | Jan 2020 | - | | 0.785 | Continuing | Continuing | Continuing |
| Primary Software Development | C/CPFF | DCS : Alexandria, VA | 0.000 | 0.490 | Jan 2018 | 0.800 | Jan 2019 | 0.865 | Jan 2020 | - | | 0.865 | Continuing | Continuing | Continuing |
| Primary Software Development | C/CPFF | AMEWAS : California, MD | 0.000 | 0.740 | Jun 2018 | 0.991 | Jun 2019 | 0.950 | Jun 2020 | - | | 0.950 | Continuing | Continuing | Continuing |
| Primary Software Development | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.160 | Dec 2018 | 0.160 | Dec 2019 | - | | 0.160 | 0.000 | 0.320 | - |
| NGNMPS Primary Software Development | C/CPFF | Northrop Grumman : Long Beach, CA | 0.000 | 0.000 | | 0.000 | | 2.500 | Jan 2020 | - | | 2.500 | Continuing | Continuing | Continuing |
| NGNMPS Primary Software Development | C/CPFF | Various : Various | 0.000 | 0.000 | | 0.000 | | 11.250 | Jan 2020 | - | | 11.250 | Continuing | Continuing | Continuing |
| NGNMPS Primary Human Factors Engineering | C/CPFF | Georgia Technical Research Institute (GTRI) : Atlanta, GA | 0.000 | 0.000 | | 0.000 | | 1.750 | Jan 2020 | - | | 1.750 | Continuing | Continuing | Continuing |
| NGNMPS Primary Software Development | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.000 | | 4.500 | Nov 2019 | - | | 4.500 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Next Gen CMBRE Development | MIPR | Dep Of Energy : Washington DC. | 0.000 | 0.000 | | 0.000 | | 13.280 | Nov 2019 | - | | 13.280 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 9.318 | 6.811 | | 7.248 | | 40.639 | | - | | 40.639 | Continuing | Continuing | N/A |

**Remarks**

FY 2020 continues to support incremental funding for JMPS Primary Software Development Framework (FW) efforts awarded via multiple contracts for service oriented architecture development.

FY 2020 supports incremental funding for the NGNMPS Primary Software Development efforts awarded via a competitive 2nd Qtr. FY 2020 contract award. The performing activities and locations are currently various to support a competitive contracting strategy. Once awarded, the performing activities and locations will be updated to reflect the selected contractors.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCWD : Point Mugu, CA | 0.208 | 0.225 | Nov 2017 | 0.216 | Nov 2018 | 0.231 | Nov 2019 | - | | 0.231 | Continuing | Continuing | Continuing |
| Systems Eng & Integration | WR | NAWCWD : Point Mugu, CA | 2.487 | 2.320 | Nov 2017 | 2.675 | Nov 2018 | 2.352 | Nov 2019 | - | | 2.352 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 1.136 | 1.305 | Nov 2017 | 1.445 | Nov 2018 | 1.430 | Nov 2019 | - | | 1.430 | Continuing | Continuing | Continuing |
| NGNMPS Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 1.750 | Nov 2019 | - | | 1.750 | Continuing | Continuing | Continuing |
| NGNMPS Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.500 | Nov 2019 | - | | 0.500 | Continuing | Continuing | Continuing |
| NGNMPS Integrated Logistics Support | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.000 | | 2.500 | Nov 2019 | - | | 2.500 | Continuing | Continuing | Continuing |
| NGNMPS Systems Engineering | C/CPFF | Zenetex : Herndon, VA | 0.000 | 0.000 | | 0.000 | | 1.350 | Jan 2020 | - | | 1.350 | Continuing | Continuing | Continuing |
| Systems Engineering/ JMPS Expeditionary | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.080 | Nov 2017 | 0.082 | Nov 2018 | 0.084 | Nov 2019 | - | | 0.084 | Continuing | Continuing | Continuing |
| Next Gen CMBRE Support | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.000 | | 0.000 | | 3.320 | Nov 2019 | - | | 3.320 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.831 | 3.930 | | 4.418 | | 13.517 | | - | | 13.517 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2213 / *Mission Planning* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

FY 2020 supports NGNMPS systems engineering and ILS activities at multiple government and contractor sites.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | WR | NAWCWD : Point Mugu, CA | 5.311 | 5.579 | Nov 2017 | 5.459 | Nov 2018 | 5.458 | Nov 2019 | - | | 5.458 | Continuing | Continuing | Continuing |
| Test & Evaluation | WR | COMOPTEVFOR : Norfolk, VA | 1.046 | 1.350 | Jan 2018 | 1.377 | Jan 2019 | 1.396 | Nov 2019 | - | | 1.396 | Continuing | Continuing | Continuing |
| NGNMPS Test & Evaluation | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.000 | | 0.300 | Nov 2019 | - | | 0.300 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.357 | 6.929 | | 6.836 | | 7.154 | | - | | 7.154 | Continuing | Continuing | N/A |

**Remarks**

FY 2020 supports the NGNMPS T&E planning activities.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support and Travel | WR | NAWCAD : Patuxent River, MD | 1.400 | 2.865 | Nov 2017 | 2.960 | Nov 2018 | 2.943 | Nov 2019 | - | | 2.943 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | Ausley Associates : Lexington Park, MD | 0.509 | 0.675 | May 2018 | 0.406 | May 2019 | 0.350 | May 2020 | - | | 0.350 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.909 | 3.540 | | 3.366 | | 3.293 | | - | | 3.293 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 21.415 | 21.210 | | 21.868 | | 64.603 | | - | | 64.603 | Continuing | Continuing | N/A |

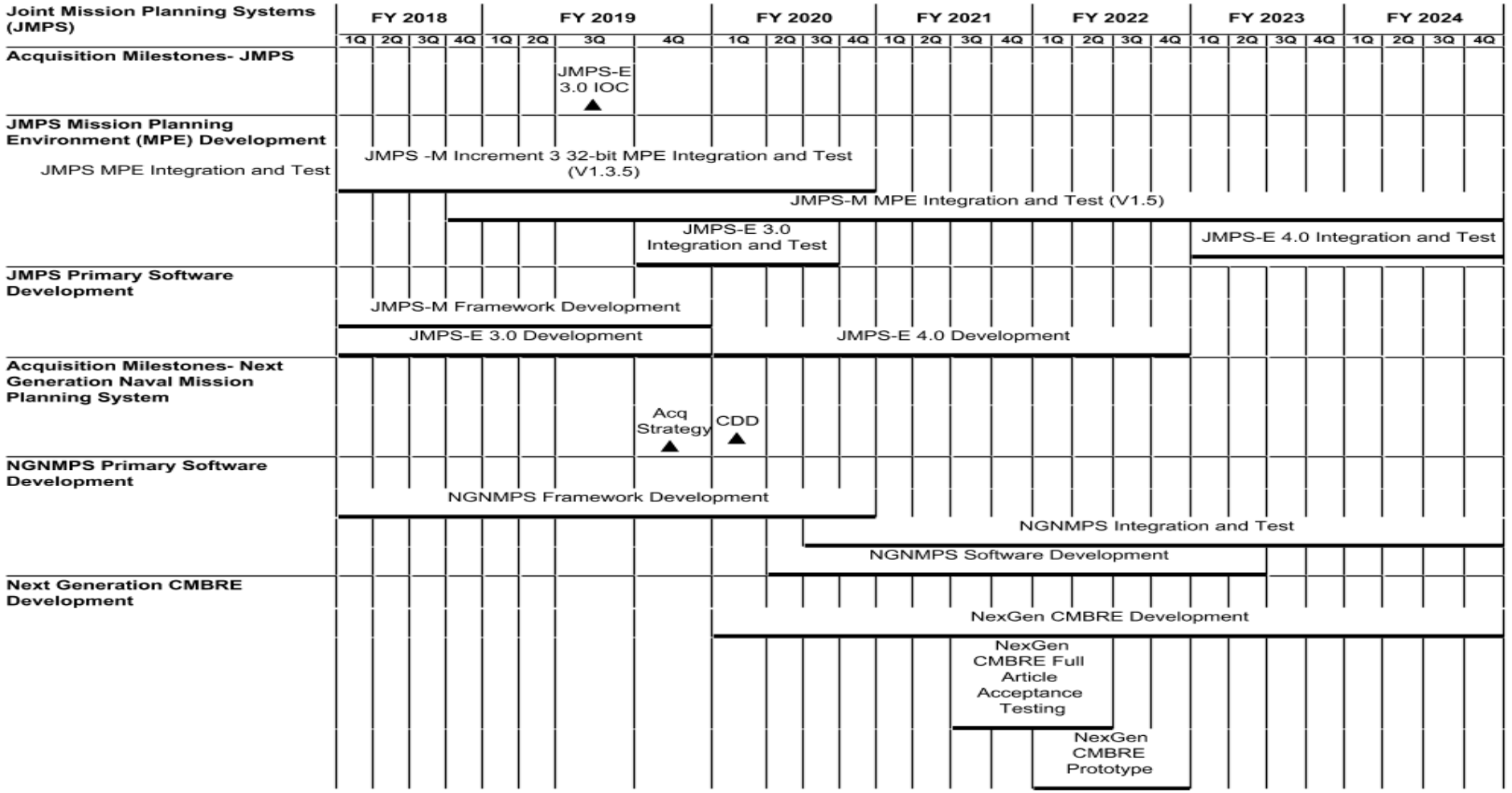
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2213 / *Mission Planning* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

Prior to FY17, the Mission Planning PU 2213 was funded under PE 0604231N.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |



| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2213 / *Mission Planning* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Joint Mission Planning Systems (JMPS)*** | | | | |
| Acquisition Milestones- JMPS: JMPS-E 3.0 Initial Operational Capability (IOC) | 3 | 2019 | 3 | 2019 |
| JMPS Mission Planning Environment (MPE) Development: JMPS MPE Integration and Test: 32 bit MPE Integration (V1.3.5) | 1 | 2018 | 4 | 2020 |
| JMPS Mission Planning Environment (MPE) Development: JMPS MPE Integration and Test: 32/64 bit MPE Integration (V1.5.X) | 4 | 2018 | 4 | 2024 |
| JMPS Mission Planning Environment (MPE) Development: JMPS MPE Integration and Test: JMPS-E 3.0/3.1 Integration and Test | 4 | 2019 | 3 | 2020 |
| JMPS Mission Planning Environment (MPE) Development: JMPS MPE Integration and Test: JMPS-E 4.0 Integration and Test | 1 | 2023 | 4 | 2024 |
| JMPS Primary Software Development: JMPS-M Framework Development | 1 | 2018 | 4 | 2019 |
| JMPS Primary Software Development: JMPS-E 3.0 Development | 1 | 2018 | 4 | 2019 |
| JMPS Primary Software Development: JMPS-E 4.0 Development | 1 | 2020 | 4 | 2022 |
| Acquisition Milestones- Next Generation Naval Mission Planning System: CDD | 1 | 2020 | 1 | 2020 |
| Acquisition Milestones- Next Generation Naval Mission Planning System: Acquisition Strategy | 4 | 2019 | 4 | 2019 |
| NGNMPS Primary Software Development: NGNMPS Framework Development | 1 | 2018 | 4 | 2020 |
| NGNMPS Primary Software Development: NGNMPS Integration and Test | 3 | 2020 | 4 | 2024 |
| NGNMPS Primary Software Development: NGNMPS Software Development | 2 | 2020 | 2 | 2023 |
| Next Generation CMBRE Development: Next Generation CMBRE Development | 1 | 2020 | 4 | 2024 |
| Next Generation CMBRE Development: Next Generation CMBRE Full Article Acceptance Testing | 3 | 2021 | 2 | 2022 |
| Next Generation CMBRE Development: Next Generation CMBRE Prototype | 1 | 2022 | 4 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2311 / *Stores Planning and Weaponeering Module* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2311: *Stores Planning and Weaponeering Module* | 10.847 | 10.868 | 10.846 | 11.283 | - | 11.283 | 11.429 | 11.526 | 11.770 | 12.007 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Prior to FY 2017, Stores Planning and Weaponeering Module (PU 2311) was budgeted under Standards Development (PE 0604215N).

**A. Mission Description and Budget Item Justification**

The Weaponeering and Stores Planning (WASP) components are integrated software products that allow aircrew to determine the best combinations of weapons and delivery conditions to achieve the desired level of target damage, eliminate weapon delivery solutions that violate aircraft Type/Model/Series (T/M/S) specific safety-of-flight envelopes, and perform detailed weapons employment planning. WASP is approved by Air Warfare Division (N98) as a flight clearance implementation system for the F/A-18 A, A+, A++, B, C, C+, D, D (RC), E, F, EA-18G; and includes potential support for other platforms to include F-35, P-8, AH-1, and other rotary wing platforms. WASP components will alert pilots if their planned weapon release conditions meet flight clearance limits, will result in bomb-to-bomb collisions, bomb-to-aircraft collisions, aircraft overstress, or excessive risk of aircraft loss/damage in the event of fuze early bursts. Weapon employment planning is fundamental to the Joint Capability Area of Force Application and joint mission areas of Strike and Amphibious Warfare. WASP provides the Navy and Marine Corp with weaponeering capabilities that are critical requirements for Interdiction, Armed Reconnaissance and Close Air Support mission planning. Therefore, WASP product availability is critical to successful employment of the Joint Mission Planning System (JMPS) for the F/A-18 A-F and EA-18G. The WASP product encompasses a multitude of Government Furnished Information software components and tools including aircraft target maneuver simulations and weapon flyout models. WASP products will require updates as emergent requirements for new aircraft T/M/S, stores and weapons are approved, new flight clearances and flight restrictions are issued by Naval Air Systems Command Headquarters and cyber security mandates are released. FY 2020 and out include funding for the research and development in order to integrate WASP with 3-D mission rehearsal, provide dynamic Safe Escape Automation Layer (SEAL) calculations on Electronic Kneeboard (EKB), develop WASP for other Navy and Marine Corps platforms, and support WASP development and integration with the Next Generation Naval Mission Planning System (NGNMPS).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 5.668 | 5.685 | 5.037 | 0.000 | 5.037 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Includes associated system engineering design, development, installation, integration and software development for Weaponeering and Stores Planning (WASP) components to support F/A-18 A-F and EA-18G. Provide domain engineering support for weapons separation, aircraft loads, flutter, fuzing and Safe Escape Automation Layer(SEAL)for application to WASP. Provide analysis of new requirements, allocation of requirements, design oversight, and life cycle management of the WASP program. Develop new | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| aircraft configuration, aircraft loading, weapon optimization, store release and delivery planning components for F/A-18 A-F and EA-18G new flight clearances and flight restrictions issued by NAVAIRSYSCOM. Provide configuration management, system administration, quality assurance, documentation, metrics and software risk management for WASP. Acquire, integrate and modify numerous Government Furnished Information (GFI) software components and tools (aircraft target maneuver simulations, weapon flyout models, etc.) that are used for the WASP software development. Integrate WASP with Joint Standoff Weapon/Joint Direct Attack Munitions/ Standoff Land-Attack Missile - Expanded Response and other weapons mission planning systems as required.<br><br>***FY 2019 Plans:***<br>Complete test and evaluation of WASP V4.0 to support an FY19 release to the Fleet. Complete test and evaluations of multiple database updates to V4.0. Continue test and evaluation of WASP V4.1<br><br>***FY 2020 Base Plans:***<br>Complete development of WASP V4.1 to support an FY 2020 release to the Fleet. Complete test and evaluations of multiple database updates to V4.1. Fund requirements definition and systems development for WASP 5.X, including integration with NGNMPS.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 Product Development (V4.X) decrease from FY 2019 is accounting for costs associated with the development of WASP V4.1 and multiple minor builds to support WASP V4.0. Test and Evaluation costs associated with WASP V4.1 is realigned to Test and Evaluation. There is no cost decrease for WASP product development efforts in FY 2020. | | | | | |
| ***Title:*** Test and Evaluation (T&E) | 2.059 | 2.020 | 3.277 | 0.000 | 3.277 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provide test and evaluation for unit and system level testing; functional qualification testing; safety of flight certification testing; integration and standards compliance testing for WASP versions. Provide JMPS MPE Integration test support. Provide testing and test support to ensure all components (to include internally developed software, externally developed GFI) comply with Department of Navy (DoN) and Department of Defense (DoD) software mandates and directives. These include Integrated Shipboard Network System IT-21, | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| and Cyber Risk Management Framework (RMF). All Fleet released software must comply with DoN and DoD software directives to permit execution on ship Local Area Networks.<br><br>***FY 2019 Plans:***<br>Complete test and evaluation of WASP V4.0 to support an FY19 release to the Fleet. Complete test and evaluations of multiple database updates to V4.0. Continue test and evaluation of WASP V4.1<br><br>***FY 2020 Base Plans:***<br>Complete test and evaluation of WASP V4.1 to support an FY 2020 release to the Fleet. Complete test and evaluations of multiple database updates to V4.1. Conduct test and evaluation of WASP 5.X, including integration with NGNMPS.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Test and Evaluation is increased due to the realignment of funds from Product Development and Program Management. | | | | | |
| ***Title:*** Program Management/Systems Engineering<br>***Articles:***<br><br>***Description:*** Provide program management and systems engineering support, which includes requirements definition and analysis, compliance with Naval Air Systems Command systems engineering technical review processes, acquisition documentation development, cost, schedule and performance management, and compliance with external directives. Provide travel for government personnel.<br><br>***FY 2019 Plans:***<br>Continue project management and systems engineering support to the WASP for future software releases to the fleet. Provide continued support for multiple database releases.<br><br>***FY 2020 Base Plans:***<br>Continue project management and systems engineering support to the WASP for future software releases to the fleet. Provide continued support for multiple database releases.<br><br>***FY 2020 OCO Plans:*** | 3.141<br>- | 3.141<br>- | 2.969<br>- | 0.000<br>- | 2.969<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Program Management/System Engineering cost decrease due to the realignment of funds supporting a Test & Evaluation (T&E) contract to T&E. Previously reported under Program Management, but it is a T&E contract. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 10.868 | 10.846 | 11.283 | 0.000 | 11.283 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Weaponeering and Stores Planning (WASP) products, delivered annually, are developed in-house by NAVAIR consisting of Naval Air Warfare Center Aircraft Division and Naval Air Warfare Center Weapons Division engineers and support contractors. The team has migrated to a smaller government team that provides functional expertise in aircraft safety-of-flight (air-vehicle stores compatibility, weapons separation, aircraft aerodynamic flutter, ground/flight loads, authorized fuze arm times, aircraft SEAL), and guided weapons employment, with the majority of the software development conducted by various contractors. The Government, engineering, test, and support teams (test facilities, functional qualification testing and certification/accreditation test) are supplemented with contractor labor.

**E. Performance Metrics**

Average time to plan a flight: Threshold value is < 1 hour average time to plan a flight that includes full aircraft loadout and weapons delivery safe escape planning. Objective value is < 15 minutes average time to plan a flight that includes full aircraft loadout and weapons delivery safe escape planning. End product is a pilot's z-diagram kneeboard card.

Interoperability: Threshold value is 100% stand alone value.
Objective value is 100% stand alone value.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development | WR | Naval Air Warfare Center Aircraft Division NAWCAD : Patuxent River, MD | 0.177 | 0.102 | Nov 2017 | 0.100 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | Continuing | Continuing | Continuing |
| Product Development | MIPR | Air Force Seek Eagle : Hill Air Force Base, UT | 0.083 | 0.085 | Mar 2018 | 0.085 | Mar 2019 | 0.085 | Mar 2020 | - | | 0.085 | Continuing | Continuing | Continuing |
| Primary Software Development | C/CPFF | DCS Corp : Alexandria, VA | 0.781 | 1.586 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.367 | 2.502 |
| Product Development (V4.X) | C/CPFF | DCS Corp : Alexandria, VA | 4.500 | 3.895 | Mar 2018 | 5.500 | Mar 2019 | 4.852 | Mar 2020 | - | | 4.852 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 5.541 | 5.668 | | 5.685 | | 5.037 | | - | | 5.037 | Continuing | Continuing | N/A |

**Remarks**

The FY 2020 Product Development (V4.X) effort decrease from FY 2019 is accounting for costs associated with the development of WASP V4.1 and multiple minor builds to support WASP v4.0. Test and Evaluation costs associated with WASP 4.1 are being realigned to Test and Evaluation. There is no cost decrease for WASP development efforts in FY 2020.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation (Gov't) | WR | NAWCAD : Patuxent River, MD | 1.185 | 1.259 | Nov 2017 | 1.190 | Nov 2018 | 1.200 | Nov 2019 | - | | 1.200 | Continuing | Continuing | Continuing |
| Test & Evaluation (Contractor) | C/CPFF | DCS Corp : Alexandria, VA | 1.084 | 0.800 | Mar 2018 | 0.830 | Mar 2019 | 0.840 | Mar 2020 | - | | 0.840 | 0.000 | 3.554 | 2.805 |
| Test & Evaluation (Contract) | C/CPFF | KBRwyle : Huntsville, AL | 0.000 | 0.000 | | 0.000 | | 1.237 | Mar 2020 | - | | 1.237 | 0.000 | 1.237 | - |
| | | **Subtotal** | 2.269 | 2.059 | | 2.020 | | 3.277 | | - | | 3.277 | Continuing | Continuing | N/A |

**Remarks**

Test and Evaluation costs increased due to the realignment of funds from Product Development and Program Management/Systems Engineering. Previously reported under Product Development and Program Management/Systems Engineering, but is a Test & Evaluation contract.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Engineering and Program Support | WR | NAWCAD : Patuxent River, MD | 1.003 | 1.200 | Nov 2017 | 1.219 | Nov 2018 | 1.246 | Nov 2019 | - | | 1.246 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | Ausley Associates : Lexington Park, MD | 0.441 | 0.450 | May 2018 | 0.307 | May 2019 | 0.300 | May 2020 | - | | 0.300 | 0.000 | 1.498 | 1.341 |
| Government Engineering Support: Guided Weapons | WR | Naval Air Warfare Center Weapons Division NAWCWD : China Lake, CA | 0.023 | 0.176 | Jan 2018 | 0.250 | Nov 2018 | 0.255 | Nov 2019 | - | | 0.255 | Continuing | Continuing | Continuing |
| Systems Engineering Support | C/CPFF | KBRwyle : Huntsville, AL | 1.500 | 1.200 | Jan 2018 | 1.250 | Mar 2019 | 1.043 | Mar 2020 | - | | 1.043 | 0.000 | 4.993 | 3.950 |
| Govt Engineering Support: Mission Planning Environment Integration | WR | NAWCWD : Point Mugu, CA | 0.060 | 0.100 | Nov 2017 | 0.100 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | Continuing | Continuing | Continuing |
| Travel | Various | NAVAIR : Patuxent River, MD | 0.010 | 0.015 | Nov 2017 | 0.015 | Nov 2018 | 0.025 | Nov 2019 | - | | 0.025 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 3.037 | 3.141 | | 3.141 | | 2.969 | | - | | 2.969 | Continuing | Continuing | N/A |

**Remarks**

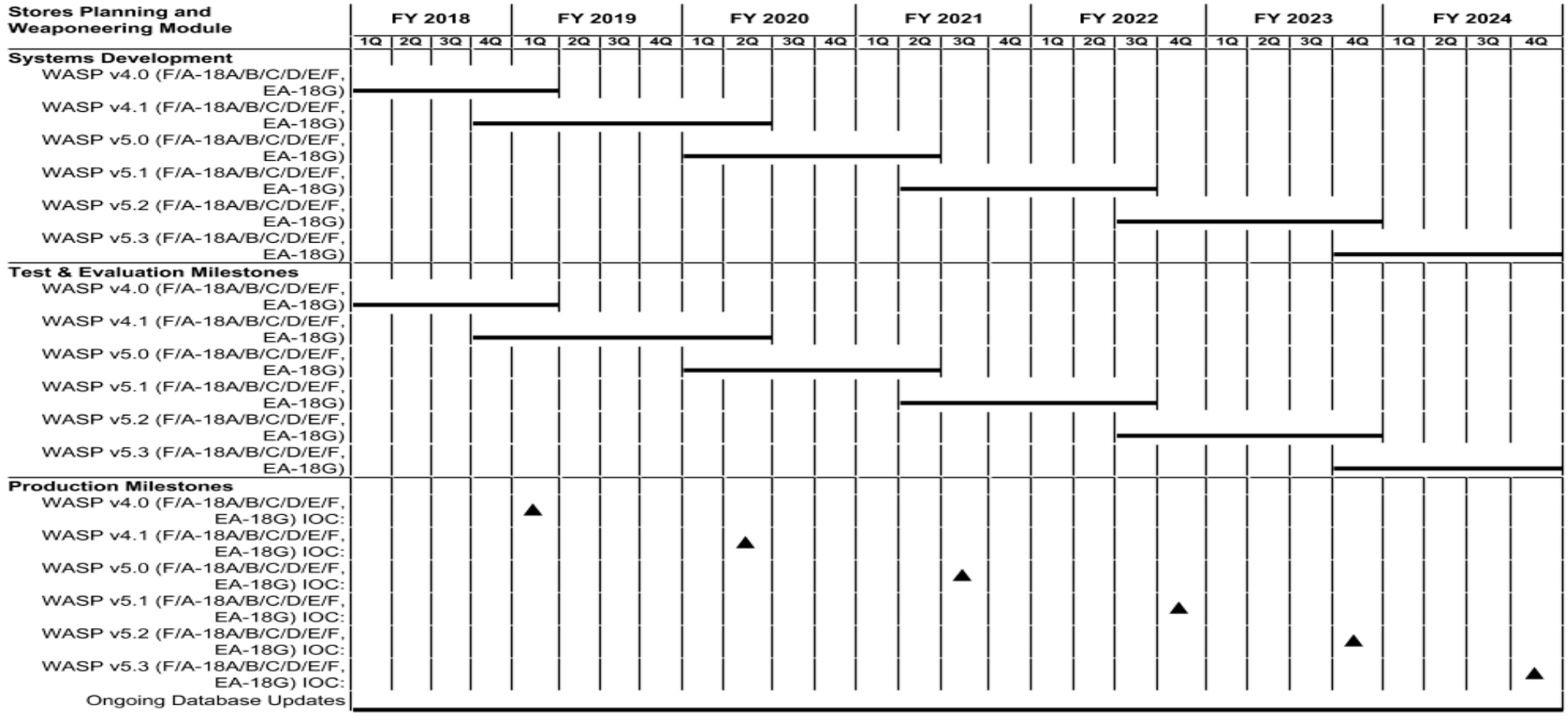
Management cost decrease is due to the realignment to Test and Evaluation.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 10.847 | 10.868 | | 10.846 | | 11.283 | | - | | 11.283 | Continuing | Continuing | N/A |

**Remarks**

Prior to FY17, PU 2311 was budgeted under PE 0604215N.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |




*2020DON - 0605215N - 2311*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2311 / *Stores Planning and Weaponeering Module* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Stores Planning and Weaponeering Module*** | | | | |
| Systems Development: WASP v4.0 (F/A-18A/B/C/D/E/F, EA-18G): | 1 | 2018 | 1 | 2019 |
| Systems Development: WASP v4.1 (F/A-18A/B/C/D/E/F, EA-18G): | 4 | 2018 | 2 | 2020 |
| Systems Development: WASP v5.0 (F/A-18A/B/C/D/E/F, EA-18G): | 1 | 2020 | 2 | 2021 |
| Systems Development: WASP v5.1 (F/A-18A/B/C/D/E/F, EA-18G): | 2 | 2021 | 3 | 2022 |
| Systems Development: WASP v5.2 (F/A-18A/B/C/D/E/F, EA-18G): | 3 | 2022 | 4 | 2023 |
| Systems Development: WASP v5.3 (F/A-18A/B/C/D/E/F, EA-18G): | 4 | 2023 | 4 | 2024 |
| Test & Evaluation Milestones: WASP v4.0 (F/A-18A/B/C/D/E/F, EA-18G): | 1 | 2018 | 1 | 2019 |
| Test & Evaluation Milestones: WASP v4.1 (F/A-18A/B/C/D/E/F, EA-18G): | 4 | 2018 | 2 | 2020 |
| Test & Evaluation Milestones: WASP v5.0 (F/A-18A/B/C/D/E/F, EA-18G): | 1 | 2020 | 2 | 2021 |
| Test & Evaluation Milestones: WASP v5.1 (F/A-18A/B/C/D/E/F, EA-18G): | 2 | 2021 | 3 | 2022 |
| Test & Evaluation Milestones: WASP v5.2 (F/A-18A/B/C/D/E/F, EA-18G): | 3 | 2022 | 4 | 2023 |
| Test & Evaluation Milestones: WASP v5.3 (F/A-18A/B/C/D/E/F, EA-18G): | 4 | 2023 | 4 | 2024 |
| Production Milestones: WASP v4.0 (F/A-18A/B/C/D/E/F, EA-18G) IOC:: | 1 | 2019 | 1 | 2019 |
| Production Milestones: WASP v4.1 (F/A-18A/B/C/D/E/F, EA-18G) IOC:: | 2 | 2020 | 2 | 2020 |
| Production Milestones: WASP v5.0 (F/A-18A/B/C/D/E/F, EA-18G) IOC:: | 3 | 2021 | 3 | 2021 |
| Production Milestones: WASP v5.1 (F/A-18A/B/C/D/E/F, EA-18G) IOC:: | 4 | 2022 | 4 | 2022 |
| Production Milestones: WASP v5.2 (F/A-18A/B/C/D/E/F, EA-18G) IOC:: | 4 | 2023 | 4 | 2023 |
| Production Milestones: WASP v5.3 (F/A-18A/B/C/D/E/F, EA-18G) IOC:: | 4 | 2024 | 4 | 2024 |
| Production Milestones: Ongoing Database Updates: | 1 | 2018 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2312 / *Common Helicopters* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2312: *Common Helicopters* | 0.614 | 0.650 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.264 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Prior to FY 2017, Common Helicopters (PU 2312) was budgeted under Standards Development (PE 0604215N). FY 2019 and out Common Helicopters (PU 2312) was consolidated under PU 2213 Mission Planning in this PE.

**A. Mission Description and Budget Item Justification**

Automated mission planning systems have focused on developing planning capabilities for fixed-wing aircraft, while the unique planning requirements for helicopters are not yet fully addressed. The unique and enhanced automated mission planning requirements that must be developed and implemented for helicopters include: data loading, an enhanced route editor (serpentine routing, hover), manipulation of higher fidelity (smaller scale) maps and imagery, enhanced performance tools (performance in and out of ground effect, performance degradation due to atmospheric conditions & elevation), and enhanced fidelity of landing zone, target zone, and threat analyses. The following type/model/series aircraft are supported by this PU: AH-1W/Z, UH-1N/Y, H-46/E, H-53D/E, H-60H/R/S and V-22. Common helicopter functionality will be developed for implementation in Joint Mission Planning System (JMPS).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 0.385 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Development of Common Helicopter functionality and integration with JMPS Framework Versions and 64-bit Operating System. Common Components include Common Mission Data Loader (CMDL), Weapon Employment Zone Overlays Tool (WEZOT) and Point Selection Tool (PST).<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Test and Evaluation | 0.265 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2312 / *Common Helicopters* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** Integration and test of Common Helicopter functionality with JMPS Framework Versions and 64-bit Operating System. Common Components include Common Mission Data Loader (CMDL), Weapon Employment Zone Overlays Tool (WEZOT) and Point Selection Tool (PST).<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.650 | 0.000 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable.

**E. Performance Metrics**

Export Mission Data to Data Transfer Device: Threshold value is < 12 minutes to transfer navigation, communication, weapon system initialization settings and intelligence data. Interoperability: Threshold value is 100% of top level Information Exchange Requirements (IERs) designated critical will be satisfied. Objective value is 100% of top level IERs will be satisfied.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>2312 / *Common Helicopters* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Software Development | C/CPFF | Joint Technology Engineering : Valparaiso, FL | 0.614 | 0.385 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.999 | 1.014 |
| | | **Subtotal** | 0.614 | 0.385 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.999 | N/A |

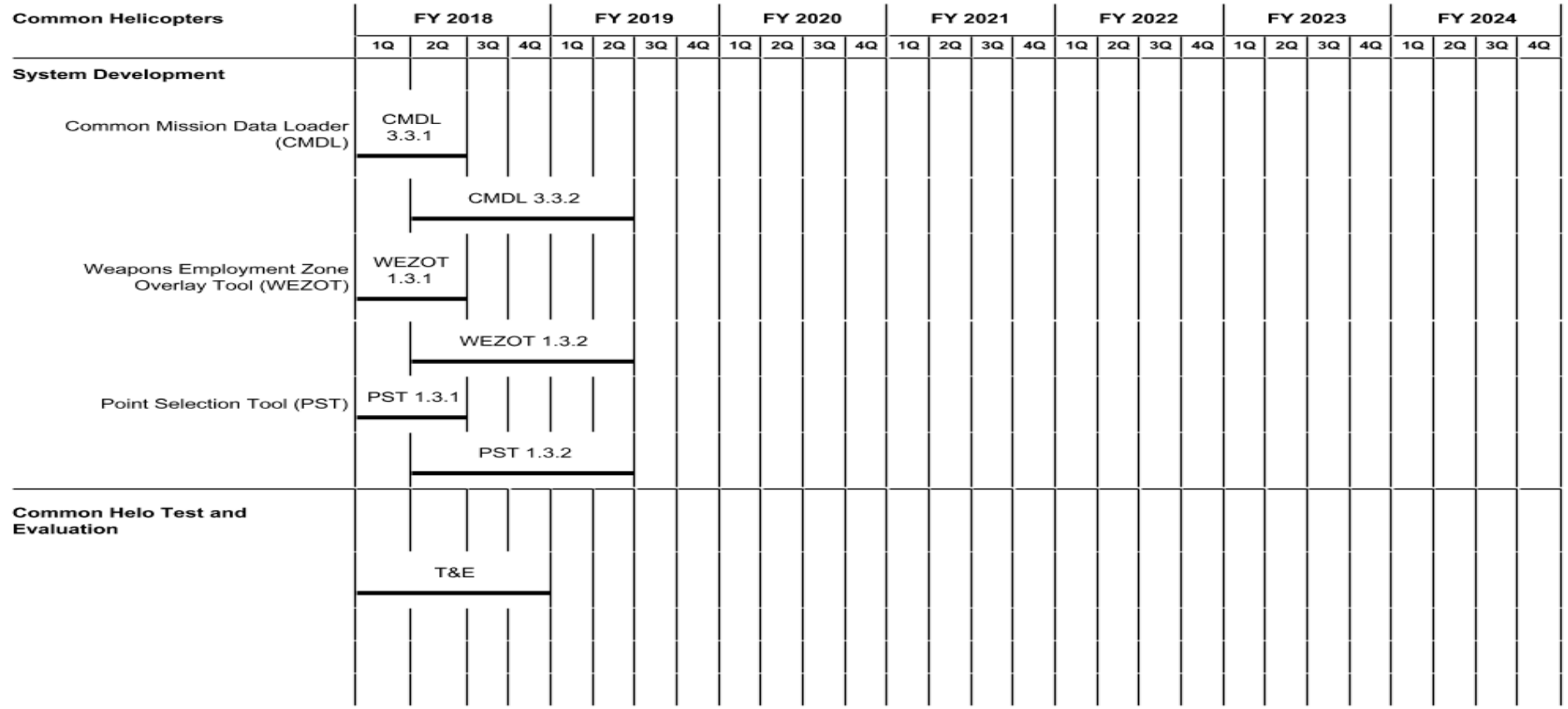
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Integration and Test | WR | NAWCWD : Point Mugu, CA | 0.000 | 0.265 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.265 | - |
| | | **Subtotal** | 0.000 | 0.265 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.265 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.614 | 0.650 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.264 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2312 / *Common Helicopters* |




*2020DON - 0605215N - 2312*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>2312 / *Common Helicopters* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Common Helicopters*** | | | | |
| System Development: Common Mission Data Loader (CMDL): CMDL 3.3.1 | 1 | 2018 | 2 | 2018 |
| System Development: Common Mission Data Loader (CMDL): CMDL 3.3.2 | 2 | 2018 | 2 | 2019 |
| System Development: Weapons Employment Zone Overlay Tool (WEZOT): WEZOT 1.3.1 | 1 | 2018 | 2 | 2018 |
| System Development: Weapons Employment Zone Overlay Tool (WEZOT): WEZOT 1.3.2 | 2 | 2018 | 2 | 2019 |
| System Development: Point Selection Tool (PST): PST 1.3.1 | 1 | 2018 | 2 | 2018 |
| System Development: Point Selection Tool (PST): PST 1.3.2 | 2 | 2018 | 2 | 2019 |
| Common Helo Test and Evaluation: | 1 | 2018 | 4 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 3.380 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 3.380 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Multi-Asset Planning and Monitoring Capability provides an accelerated, enhanced, dynamic mission planning capability at reduced cost addressing the multi-vehicle multi-domain fleet capability gap. This unique planning service and visualization tool will allow combat aircrew to visualize time critical attack plan and track plan status vs. execution. This capability will enable Airwing planners, Maritime Operations Center (MOC) personnel, Composite Warfare Commander (CWC) planners and watch standers to participate in time-sensitive strike planning and execution monitoring for the new net-enabled weapons for long range over the horizon targets.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Planning and Execution Monitoring | 3.380 | 0.000 |
| ***FY 2018 Accomplishments:*** Provides integration of the multi-domain capabilities developed under the Rapid Integration Funds (RIF) program and integrates them into the emerging Next Generation Naval Mission Planning suite of tools. Tools being developed include improving a Cross Domain Security solution for passing targeting and planning data, use of advanced cloud computing infrastructure, and the replacement of previous monolithic code into more collaborative micro-services. | | |
| ***FY 2019 Plans:*** N/A | | |
| **Congressional Adds Subtotals** | 3.380 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Provides integration of the demonstrated multi-domain capabilities developed under the Rapid Integration Funds (RIF) program and integrates and demonstrates them into the emerging Next Generation Naval Mission Planning suite of tools. Tools being developed include improving a Cross Domain Security solution for passing targeting and planning data, use of advanced cloud computing infrastructure, and the transition of previous monolithic code into more collaborative micro-services.

**E. Performance Metrics**

Average time to plan a flight: Threshold value is < 1 hour average time to plan a flight that includes a Military Training Route (MTR), routing to and from the MTR, kneeboard card production, Instrument Flight Rules (IFR) flight planning materials and a Data Transfer Device (DTD) Load. Objective value is < 30 minutes average time to plan a flight that includes a MTR, routing to and from the MTR, kneeboard card production, IFR flight planning materials and a DTD Load.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

Interoperability: Threshold value is 100% of top level Interoperability Exchange Requirements (IERs) designated critical will be satisfied.
Objective value is 100% of top level IERs will be satisfied.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605215N / *(U)Mission Planning* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | SS/CPFF | Progeny Systems : California, MD | 0.000 | 0.750 | Nov 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.750 | - |
| Software Development | SS/BOA | Progeny Systems PIII : California, MD | 0.000 | 0.926 | Feb 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.926 | - |
| Software Development | SS/BOA | MTI : Park City, UT | 0.000 | 0.926 | Feb 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.926 | - |
| Software Development | SS/CPFF | IAI : Lexington Park, MD | 0.000 | 0.710 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.710 | - |
| | | **Subtotal** | 0.000 | 3.312 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.312 | N/A |

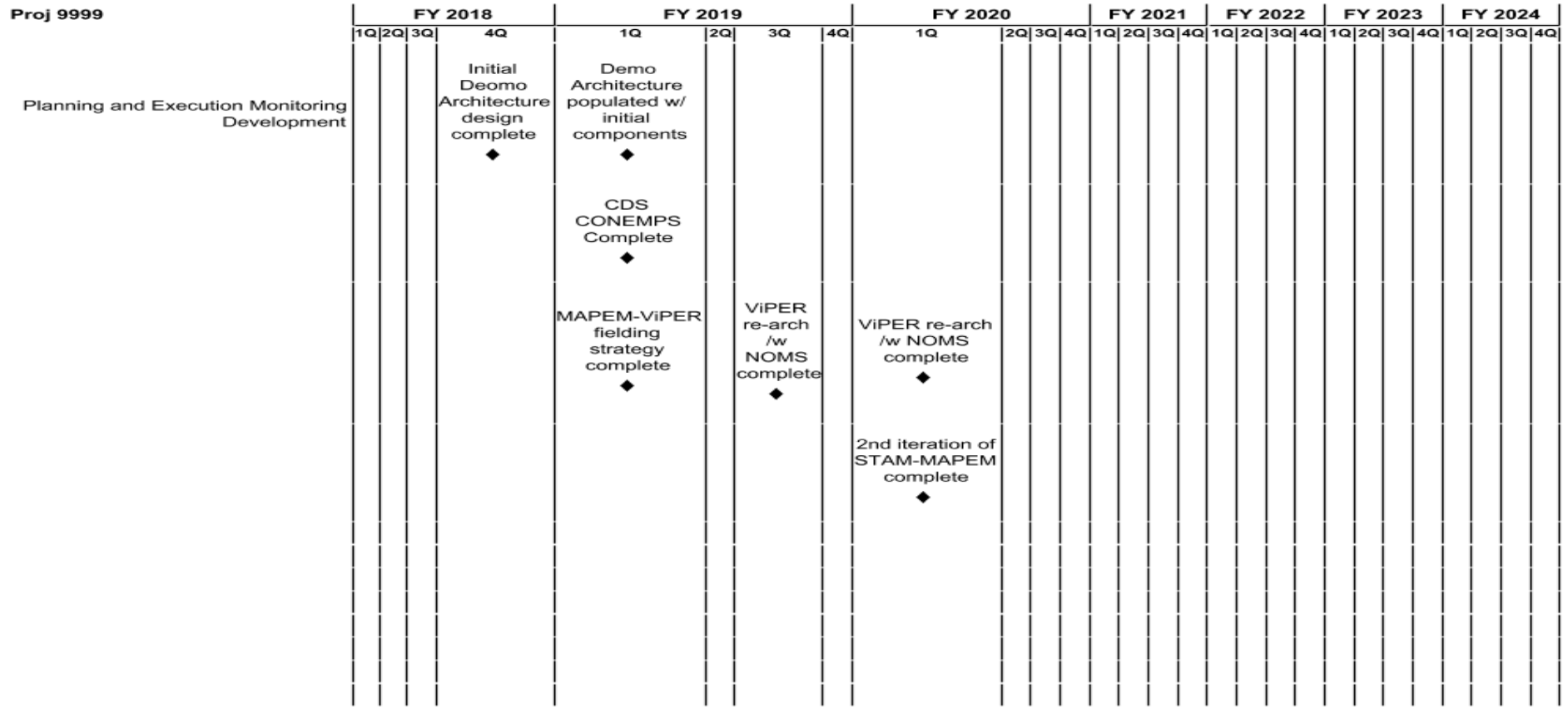
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | NAWCWD : China Lake, CA | 0.000 | 0.040 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.040 | - |
| Program Management Support | WR | NAWCAD : Pax River, MD | 0.000 | 0.028 | Nov 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.028 | - |
| | | **Subtotal** | 0.000 | 0.068 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.068 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 3.380 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.380 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020DON - 0605215N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605215N / *(U)Mission Planning* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Planning and Execution Monitoring Development: Initial Demonstration Architecture design complete | 4 | 2018 | 4 | 2018 |
| Planning and Execution Monitoring Development: Demonstration Architecture populated with initial components | 1 | 2019 | 1 | 2019 |
| Planning and Execution Monitoring Development: CDS CONEMPS Complete | 1 | 2019 | 1 | 2019 |
| Planning and Execution Monitoring Development: MAPEM-ViPER fielding strategy complete | 1 | 2019 | 1 | 2019 |
| Planning and Execution Monitoring Development: STAM-MAPEM digitial connection demonstration | 3 | 2019 | 3 | 2019 |
| Planning and Execution Monitoring Development: ViPER re-arch /w NOMS complete | 1 | 2020 | 1 | 2020 |
| Planning and Execution Monitoring Development: 2nd iteration of STAM-MAPEM complete | 1 | 2020 | 1 | 2020 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605217N *I (U)Common Avionics* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 42.711 | 47.338 | 51.486 | 43.187 | - | 43.187 | 36.859 | 36.232 | 35.747 | 36.469 | Continuing | Continuing |
| 0572: *JT Service/NV Std Avionics CP/SB* | 42.711 | 47.338 | 51.486 | 43.187 | - | 43.187 | 36.859 | 36.232 | 35.747 | 36.469 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Such air combat electronics developments include communications and airborne networking, navigation and sensors, flight avionics, safety systems, and flight mission information systems for both forward fit and retrofit aircraft. These efforts continue to maintain federated systems while encouraging transition of procurements to support a modular system for enhanced performance and affordability. Consideration is given up front to reduce acquisition costs through larger procurement quantities that satisfy multi-aircraft customer requirements and that reduce life cycle costs in the areas of reliability, maintainability, and training.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 58.163 | 51.486 | 46.841 | - | 46.841 |
| Current President's Budget | 47.338 | 51.486 | 43.187 | - | 43.187 |
| Total Adjustments | -10.825 | 0.000 | -3.654 | - | -3.654 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -1.500 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -3.000 | - | -3.000 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.654 | - | -0.654 |
| • Congressional General Reductions Adjustments | -0.023 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | R-1 Program Element (Number/Name)<br>PE 0605217N *I (U)Common Avionics* | | | |
| • Congressional Directed Reductions | -9.302 | - | - | - | - |
| Adjustments | | | | | |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $3.000 million to account for the availability of prior year execution balances. Additional reduction of $0.654 million for miscellaneous rate adjustments.

Technical: Not applicable.

Schedule:

Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM): Removed the Required Navigation Performance Area Navigation (RNP RNAV) developmental requirements and technologies/certifications from schedule due to completion in FY19. Extended Evaluate CNS/ATM technologies/develop solutions to support platform integrations to include 4Q/24.

Tactical Communications (TACCOM): Satellite Communication (SATCOM) S/W Development (with Mobile User Objective System (MUOS)) extended to end of FY19 due to delays in MUOS verification lab availability. The associated initial MUOS S/W release shifted to 3Q/19. Initial National Security Agency (NSA) and Joint Interoperability Test Command (JITC) certification for MUOS inclusive S/W build adjusted to match. NSA and JITC certifications adjusted in the following years based on predictions of required ARC-210 radio software updates and/or mode functionality verifications, as more platforms incorporate ARC-210 Gen 6 radios. NSA and/or JITC re-certification requirements contingent on whether future software revisions impact the radio's crypto sub-system or frequency spectrum utilization, respectively. MIL Standard Evolution for Variable Message Format (VMF) extension to end of FY22 and Transmission Security (TRANSEC)/ Crypto Modernization with Tactical Secure Voice (TSV) extension to end of FY24 reflect ongoing evolution of the associated MIL Standard 188-220 software defined radio data protocols. Ongoing TACCOM coordination with NSA regarding TRANSEC specification releases, and SPAWAR regarding ground controller interoperability testing ensure ARC-210 equipped air platforms can maintain connectivity with ground radios.
FY18: Shifted Initial JITC Cert from 4Q/18 to 2Q/19.

Ground Proximity Warning System/Terrain Awareness System (GPWS/TAWS II): TAWS II schedule change is a result of performance issues identified during H-60 Developmental Testing and the inability of the prime contractor to make any additional changes prior to Fleet Release of Software Configuration SC 18-03. Fleet Release of SC 18-03 has been delayed beyond existing TAWS II APBA thresholds and the earliest opportunity to readdress H-60 issues not until FY24. V-22 will replace H-60 as the initial T/M/S aircraft for full TAWS II integration. Funding reprioritized to support Open Architecture in Avionics Architecture Team (AAT) in FY18, FY19 and FY20.
FY18: Removed H-60 TAWS II MS C 3Q/18.
FY19: Adjusted TAWS II Software Re-Architecture to 3Q/18 extending through 4Q/20; Removed H-60 TAWS II IOC from 2Q/19.
FY20: Changed Integration contract from V-22 to H-60 remaining in 3Q/20.
FY21: Added H-60 TAWS II Software Development 4Q/20 through 4Q/21; Added V-22 TAWS II DT 2Q/21 through 1Q/23 due to fly, fix, fly.
FY22: Added H-60 Integrated Logistic Assessment (ILA) 4Q/22; added V-22 ILA 2Q/22.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605217N *I (U)Common Avionics* |

FY23: Added H-60 TAWS II Software Development 1Q/23; added V22 MS C 2Q/23; added V-22 Fleet Release 4Q/23.
FY24: Added H-60 Fleet Release 4Q/24; added TAWS II Follow-on Developmental Platforms 1Q/24 to 4Q/24.

Collaborative Warfare (CW): Extended Naval Aviation Netted Sensors and Maritime Targeting Experimentation, Naval Aviation and Maritime Targeting Requirements and CONOPS, Standards and Architectures/Requirements Development to include 4Q/24.

Avionics Component Improvement Program (AvCIP): Extended Acquisition Milestones to include FY24.

Mid Air Collision Avoidance Capability (MCAC): Added Decision Analysis Support (DAS) 3Q/18 to 1Q/19; Added Program Smart Shutdown 2Q/19 to 4Q/19. MCAC Program Termination effective FY19 per N98, Ser N98/18U142416. Funding reprioritized to support Open Architecture in Avionics Architecture Team (AAT) in FY19 and FY20.

(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605217N / *(U)Common Avionics* | Project (Number/Name)<br>0572 / *JT Service/NV Std Avionics CP/SB* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0572: *JT Service/NV Std Avionics CP/SB* | 42.711 | 47.338 | 51.486 | 43.187 | - | 43.187 | 36.859 | 36.232 | 35.747 | 36.469 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

**A. Mission Description and Budget Item Justification**

Joint Services/Navy Standard Avionics Components and Subsystems: This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Standard avionics capabilities under
development include the Joint Service Review Committee for Avionics Standardization (JSRC-AS), Communication Navigation Surveillance/Air Traffic Management (CNS/ATM), Tactical Communications (TACCOM), Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II), Collaborative Warfare (CW), Avionics Component Improvement Program (AvCIP), Mid Air Collision Avoidance Capability (MCAC), and Avionics Architectures Team (AAT). Participation in Human Factors Quality Management Board ensures Navy safety upgrades and mandatory safety improvements for naval aircraft.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Joint Service Review Committee for Avionics Standardization (JSRC-AS) | 0.582 | 0.995 | 1.015 | 0.000 | 1.015 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The JSRC-AS program supports Congressional and Assistant Secretary of the Navy for Research, Development and Acquisition direction to control the growing proliferation of unique avionics and improve coordination among the services through the identification, development, and promotion of investigative and development efforts across the services and U.S. Coast Guard. The JSRC-AS supports the development, analysis and review of new avionics requirements with potential for joint service application. The JSRC-AS consists of an O-6 Level principal from each service and U.S. Coast Guard, as well as the appropriate staff, to support joint service working group efforts. The JSRC-AS reports to the O-7 level tri-service Aviation Common Systems Board who reports to the O-9 level Joint Aeronautical Commanders Group. | | | | | |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Provide leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting commonality and joint programs with focus on interoperability, communications, navigation, Joint Services avionics obsolescence management, and update of the Core Avionics Master Plan.<br>***FY 2020 Base Plans:***<br>Provide leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting commonality and joint programs with focus on interoperability, communications, navigation, Joint Services avionics obsolescence management, and update of the Core Avionics Master Plan.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to escalation factor. | | | | | |
| ***Title:*** Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) | 2.195 | 1.368 | 0.136 | 0.000 | 0.136 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This program will conduct and support CNS/ATM research, studies, development, integration, demonstration, test and evaluation efforts for Naval aviation platforms in development. Platform integration of Mode Select (S), 8.33 kHz, Reduced Vertical Separation Minimum (RVSM), Required Navigation Performance Area Navigation (RNP RNAV) to include M Code, and Automatic Dependent Surveillance-Broadcast Out (ADS-BO) functional integration and certification efforts into Naval aircraft. Assist with insertion of communication, navigation, surveillance, and supporting technologies and conduct capability certification on developmental platforms such as F-35, CH-53K, and Unmanned Air Systems. Capabilities include Mode S, 8.33 kHz, RVSM, RNP RNAV, ADS-BO, and other civil and military capabilities.<br>***FY 2019 Plans:***<br>Assist with insertion and integration of Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) technologies and certification of developmental platforms. Evaluate technologies and develop solutions to support platform integrations. Develop CNS/ATM Common Components to support RNP/RNAV developmental platform requirements. Continue integration/certification of Mode Select, 8.33 kHz, Reduced Vertical Separation Minimum (RVSM), RNP/RNAV, and ADS-B (Out) into CH-53K. Research and develop GPS enhancements to support CNS/ATM RNP RNAV improvements. Research and develop ADS-B (Out) System Design Assurance requirements as well as compatibility with the emerging GPS M Code and its impact on RNP RNAV.<br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue to evaluate technologies and develop solutions to support platform integrations.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease between FY19 and FY20 is due to the completion of CH-53K CNS/ATM integration/certifications being completed in FY19. | | | | | |
| ***Title:*** Tactical Communications (TACCOM) | 17.314 | 19.479 | 12.906 | 0.000 | 12.906 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This program will conduct research, studies, development, integration, demonstration, test and evaluation efforts to ensure tactical communication systems and capabilities are developed and available to support naval aviation requirements. Perform tactical communication platform integration studies and activities to determine technical and cost<br>effective solutions across naval aviation. Develop tactical communications (voice/data) requirements, concepts and systems which have application across naval aviation. Support all necessary tasks to ensure evolution of legacy communications systems incorporating programmable Communication Security/Information Assurance, Transmission Security (TRANSEC) mandated National Security Agency (NSA) Crypto Modernization initiatives, Tactical Secure Voice (TSV) Suite B, Combat Net Radio (CNR) Variable Message Format (VMF), Beyond Line-of-Sight, Satellite Communication (SATCOM) Modernization including Mobile User Objective System (MUOS), High Frequency, Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN), civil interoperability, and data link into the ARC-210 system. Support for networking requirements development and prototyping, Integrated Waveform (IW), Intelligence Broadcast System over modern Code Division Multiple Access based satellite channels, Tactical Networks, Data Links, and Link 16.<br>***FY 2019 Plans:***<br>Continue SATCOM S/W development with MUOS capabilities. Complete crypto engine integration for NSA and Information Assurance (IA) certification. Continue Combat Net radio interoperability with SATURN waveform. Continue TRANSEC SATCOM Crypto Modernization in accordance with NSA directives and TSV Suite B for interoperability.<br>***FY 2020 Base Plans:***<br>Continue SATCOM S/W development with MUOS capabilities. Continue crypto engine integration for NSA and Information Assurance (IA) certification. Continue Combat Net radio interoperability with SATURN waveform. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue TRANSEC SATCOM Crypto Modernization in accordance with NSA directives and TSV Suite B for interoperability.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY19 to FY20 is due to completion of Gen5A radio efforts in FY19. Prior to FY20, the integration of the Transmission Security and Suite B changed from a two radio configurations to one configuration. | | | | | |
| ***Title:*** Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) | 5.932 | 6.168 | 6.267 | 0.000 | 6.267 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This program will conduct research, studies, development, integration, demonstration, test and evaluation efforts to meet naval aviation GPWS/TAWS II requirements. These requirements span all operational modes and operational environments, to include Degraded Visual Environment. Perform GPWS/TAWS II platform integration studies and activities to determine technical and cost effective solutions across naval aviation. Develop GPWS/TAWS II solutions tailored to platform performance and range of military operations. Develop simulation models for use at Manned Flight Simulator (MFS) or other simulation environments as required for platform tailoring, including procurement of test article hardware. Evaluate aircraft simulation models for suitability in GPWS/TAWS II development effort. Develop GPWS/TAWS II algorithms utilizing simulation environments as real-time hardware and pilot in the loop tool. Develop and evaluate algorithm interfaces necessary for integration of the algorithm within platform host computer. Develop software code to execute GPWS/TAWS II algorithm in host platforms.<br>***FY 2019 Plans:***<br>Continue on the TAWS II software Re-Architecture to meet MILSTD 882E and begin requirements development on the V-22.<br>***FY 2020 Base Plans:***<br>Award the H-60 Integration Contract. Complete TAWS II Software Re-Architecture and begin H-60 Software Development.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase from FY19 to FY20 is due to escalation factor. | | | | | |
| ***Title:*** Collaborative Warfare (CW) | 0.224 | 0.244 | 0.250 | 0.000 | 0.250 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** The CW component is a Research & Development effort to identify targeting gaps and determine the warfighting benefit of integrating networked capabilities into naval aircraft to fill those gaps. The CW component also addresses maritime targeting gaps for naval aircraft to operate more effectively with other military services. The following efforts are included: 1) Comprehensive naval aviation and maritime targeting requirements that map fleet gaps and requirements to cross-platform naval aviation solutions. 2) Netted sensors and maritime targeting capability proof of concept prototype demonstrations leveraging the Navy's Fleet Experimentation campaign. 3) Coordinating Naval Aviation requirements with the Office of Naval Research Future Naval Capability Enabling Capability for the Common Radio Enhancement (CoRE). 4) Coordination of Naval Aviation strategy with Intelligence Community (IC) efforts in the areas of High Side Data Fusion, Combat Systems Integration, and National to Tactical Integration. | | | | | |
| ***FY 2019 Plans:***<br>Continue executing to Naval Aviation and Maritime Targeting Experimentation and Requirements. Develop requirements, standards, and architectures in support of new and updated netted-sensors' Concept of Operations and capabilities. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue executing to Naval Aviation and Maritime Targeting Experimentation and Requirements. Continue to develop requirements, standards, and architectures in support of new and updated netted-sensors' Concept of Operations and capabilities. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to escalation factors. | | | | | |
| ***Title:*** Avionics Component Improvement Program (AvCIP) | 4.536 | 4.872 | 4.971 | 0.000 | 4.971 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Investigate high value Return On Investment component improvement candidate projects. Design and develop solutions that correct avionics systems reliability, performance and sustainment deficiencies in support of NAVAIR Commander's Strategic Imperatives of 'Aligning existing resources to better support today's | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Readiness' and 'Increase Speed of Products to the Fleet.' Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic aviation electronics systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten<br>to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top<br>sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of $310M in cost for the $72M of funding invested through 2018.<br><br>***FY 2019 Plans:***<br>Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).<br><br>***FY 2020 Base Plans:***<br>Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to escalation factor. | | | | | |
| ***Title:*** Mid Air Collision Avoidance Capability (MCAC) | 2.054 | 0.913 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** This program will conduct research, studies, and development, integration, demonstration, test and evaluation | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| efforts to meet Naval Aviation Mid Air Collision Avoidance Capability (MCAC) requirements. These requirements span all operational modes and operational environments, to include Degraded Visual Environment. Perform (MCAC) platform integration studies and activities to determine technical and cost effective solutions across Naval Aviation. Develop MCAC solutions tailored to platform performance and range of military operations. Develop simulation models for use at Manned Flight Simulator (MFS) or other simulation environments as required for platform tailoring, including procurement of test article hardware. Evaluate aircraft simulation models for suitability in MCAC development effort. Develop MCAC solutions utilizing simulation environments as real-time hardware and pilot in the loop tools. Develop and evaluate interfaces necessary for integration of MCAC within platform host environment.<br><br>***FY 2019 Plans:***<br>Completed Decision Analysis Support (DAS). MCAC program terminated effective FY19 per N98, Ser N98/18U142416. Working smart shutdown to shelve the algorithm/software.<br><br>***FY 2020 Base Plans:***<br>N/A<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Decrease from FY19 to FY20 is due to program termination. | | | | | |
| ***Title:*** Avionics Architectures Team (AAT)<br>***Articles:***<br><br>***Description:*** The Avionics Architectures Team (AAT) provides hardware and software (HW/SW) standards and product line development and management for common HW/SW operating environments to establish testable open architecture requirements in accordance with National Defense Authorization Act (NDAA) Section 801 Open Architecture language, DoD Directive 5000.1, N6/N7 Naval Open Architecture Requirements Letter 9010, Ser. N6N7/5U916276, and SECNAVINST 5000.2E. The Future Airborne Capability Environment (FACE) Technical Standard is developed through Navy, Army, Air Force, Industry and Academia collaboration in accordance with Public Law 104-113. The Hardware Open Systems Technologies (HOST) standard is being developed through government and academia collaboration and will be provided to industry for prototyping efforts. The Functional Architecture for Strategic Reuse (FASTR) initiative will define a standard process for mission level capability decomposition to support product line development and management. The AAT provides Subject Matter Experts to define and architect a set of Open Architecture Standards and product lines, design | 14.501<br>- | 17.447<br>- | 17.642<br>- | 0.000<br>- | 17.642<br>- |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| principles and guidance, development and integration tools, acquisition strategy, contracting guidance and cost estimates. The results will enable Department of Defense (DoD) weapons systems to systematically procure open, modular and reconfigurable software architectures, reuse HW/SW and deliver scalable, portable and interoperable war fighting capabilities at a faster rate, reducing redundant development costs and increasing competition. Infrastructure components and frameworks built to these standards will support Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) capability upgrades on various platforms by enabling integration of common, non-proprietary applications. The AAT initiatives enable the government's role as Lead Systems Integrator, per the Weapons System Acquisition Reform Act (WSARA) 2009, and cost effectively manage data rights for reuse across the DoD. | | | | | |
| ***FY 2019 Plans:***<br>Provide development support, mission based engineering, systems engineering and program management for design and acquisition strategy implementation guidance. Generate revisions for future editions of the FACE Technical Standard based on issues identified by government and industry consortium and develop corresponding conformance tools. Research new hardware technologies and develop Tier 2 HOST specifications to support widely adopted commercial technologies and platform requirements. Provide input to platforms developing Tier 3 HOST specifications. Assist platforms with strategies for modular functional architectures and implementation of FACE and HOST standards. Participate in international collaboration efforts to define comprehensive open architecture strategy. Generate alignment strategies for a comprehensive open architecture approach between Navy, Army and Air Force. Support the implementation of Naval Aviation's data model strategy. Provide subject Matter Expert support for platform integration and competitive source selection. Academia prototyping and demonstration efforts for FACE, FASTR and HOST initiatives. | | | | | |
| ***FY 2020 Base Plans:***<br>Provide development support, mission based engineering, systems engineering and program management for design and acquisition strategy implementation guidance. Generate revisions for future editions of the FACE Technical Standard based on issues identified by government and industry consortium and develop corresponding conformance tools. Research new hardware technologies and develop Tier 2 HOST specifications to support widely adopted commercial technologies and platform requirements. Provide input to platforms developing Tier 3 HOST specifications. Assist platforms with strategies for modular functional architectures and implementation of FACE and HOST standards. Participate in international collaboration efforts to define comprehensive open architecture strategy. Generate alignment strategies for a comprehensive open architecture approach between Navy, Army and Air Force. Support the implementation of Naval Aviation's data model strategy. Provide subject Matter Expert support for platform integration and competitive source selection. | | | | | |

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|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Academia prototyping and demonstration efforts for Future Airborne Capability Environment (FACE), Functional Architecture for Strategic Reuse (FASTR) and Hardware Open Systems Technologies (HOST) initiatives.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase from FY19 to FY20 is due to the increased demand for Subject Matter Expert support for platform integration. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 47.338 | 51.486 | 43.187 | 0.000 | 43.187 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0577: *Common Avionics Changes* | 107.249 | 117.551 | 102.107 | - | 102.107 | 108.559 | 106.738 | 129.090 | 132.152 | 430.757 | 3,836.139 |

**Remarks**

**D. Acquisition Strategy**

Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) program is a system of systems. The program will encompass the integration of various systems which will be procured utilizing existing contracts for integration on forward-fit and retrofit platforms to provide CNS/ATM functionality. Tactical Communications (TACCOM) is utilizing a firm fixed price contract to Collins Aerospace for research and development of the ARC-210 Gen 5/6 and other Navy contract vehicles for integration studies. The Navy will integrate systems and components to satisfy platform requirements to achieve tactical communication capability as determined by analyses. Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) Software Modules will be developed by a Government Software Product Team in collaboration with Industry where required. Avionics Component Improvement Program (AvCIP) will annually review, compete and select candidate component improvement proposals according to urgency, criticality of warfighting contributions, technical risk, breadth of application, and scope of Return On Investment (ROI). Projects are selected by a panel of Avionics management experts, including representatives from OPNAV N98, NAVAIR, NAVICP, and the Fleet. Projects are executed by managers in platform or commodity offices that own the component. The AvCIP program management team manages project selection, allocates funds, monitors multiple project executions against proposed spend plans, and tracks solution performance and achievement of projected ROIs over time using Fleet maintenance and component performance databases. Cost avoidances are coordinated with OPNAV N98 to balance Flying Hour Program costs. Component improvement solutions include modular hardware, software and material upgrades. Resources cover engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Mid Air Collision Avoidance Capability (MCAC) is the capability umbrella which encompasses all systems designed and developed which aid in air-to-air collision avoidance. Systems include but are not limited to Traffic Collision Avoidance Systems and Mid Air Collision Avoidance Systems. MCAC Software

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

Modules will be developed by a Government Software Product Team in collaboration with Industry where required. MCAC Program Termination effective FY19 per N98, Ser N98/18U142416. Avionics Architectures Team (AAT) will provide acquisition strategy guidance and support to platforms implementing open systems architectures to address open architecture requirements.

**E. Performance Metrics**

Joint Services Review Committee for Avionics (JSRC-AS) - Provide leadership in support of the Navy's interest to the JSRC tri-service committee promoting commonality and joint programs with focus on interoperability, communications, Communication Navigation Surveillance/Air Traffic Management (CNS/ATM), Joint Services avionics obsolescence
management and the update of the Core Avionics Master Plan. Support and participate in Naval Aviation Requirements Group panels, Operational Advisory Group, and Human Factors Quality Management Board.
Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) - Successfully complete platform integration, test, and certifications.
Tactical Communications (TACCOM) - Achieve Joint Interoperability Test Command and National Security Agency certifications on system developmental efforts to meet operational requirements.
Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) - Develop algorithm and software to meet platform specific requirements and integrations. Deliver TAWS II on schedule for incorporation with first available over-arching platform software builds.
Collaborative Warfare (CW) - Identify collaborative warfighting capability gaps and ensure the development of the most intelligent, cost effective, and timely solutions to fill those gaps.
Avionics Component Improvement Program (AvCIP) - Successful project competition and selection, execution of allocated funds, fielding of solutions, and documentation of component performance enhancement and benefits, to include operational readiness improvements, avoidance of grounding aircraft, preclusion of loss of mission capabilities and life cycle sustainment cost avoidances.
Mid Air Collision Avoidance Capability (MCAC) - MCAC Program Termination effective FY19 per N98, Ser N98/18U142416.
Avionics Architectures Team (AAT) - Provide leadership in support of the Navy's interest to the Future Airborne Capability Environment (FACE) Consortium. Participate in technical and business working groups within the FACE Consortium to foster solutions that promote interoperable and integrated warfighting capability for all services. Successfully decompose, prototype and demonstrate FACE conformant applications and FACE compatible operating environments. Develop technical specifications for Hardware Open System Technologies (HOST). Prototype and demonstrate HOST avionics components.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
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| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Dev CNS/ATM | SS/CPFF | Sikorsky : Stratford, CT | 0.000 | 1.462 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.462 | 1.462 |
| Primary Hardware Dev | Various | Various : Various | 1.897 | 5.511 | Jan 2018 | 9.088 | Jan 2019 | 8.959 | Jan 2020 | - | | 8.959 | Continuing | Continuing | Continuing |
| Primary Hardware Dev | WR | NAWCAD : Patuxent River, MD | 1.195 | 0.476 | Nov 2017 | 1.633 | Nov 2018 | 1.650 | Nov 2019 | - | | 1.650 | Continuing | Continuing | Continuing |
| Aircraft Integration TACCOM | SS/FFP | Collins Aerospace : Cedar Rapids, IA | 6.511 | 10.488 | Jul 2018 | 11.724 | Jan 2019 | 6.496 | Jan 2020 | - | | 6.496 | 0.000 | 35.219 | 35.219 |
| Aircraft Integration GPWS/ TAWS II | SS/CPIF | Lockheed Martin : Owego, NY | 0.000 | 1.068 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.068 | 1.068 |
| Aircraft IntegrationTACCOM | C/CPFF | Collins Aerospace : Cedar Rapids, IA | 3.312 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.312 | 3.312 |
| Aircraft Integration | Various | Various : Various | 0.000 | 0.000 | | 0.419 | Nov 2018 | 0.428 | Nov 2019 | - | | 0.428 | Continuing | Continuing | Continuing |
| Systems Engineering AAT | MIPR | DTIC : Fort Belvior, VA | 8.545 | 8.771 | Jan 2018 | 6.247 | Jan 2019 | 6.487 | Jan 2020 | - | | 6.487 | 0.000 | 30.050 | 30.050 |
| Systems Engineering TACCOM | WR | NAWCAD : Patuxent River, MD | 2.505 | 1.881 | Dec 2017 | 1.022 | Nov 2018 | 1.110 | Nov 2019 | - | | 1.110 | Continuing | Continuing | Continuing |
| Systems Engineering | Various | Various : Various | 2.409 | 2.067 | Jan 2018 | 0.720 | Dec 2018 | 0.560 | Dec 2019 | - | | 0.560 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.569 | 0.716 | Nov 2017 | 0.799 | Nov 2018 | 0.812 | Nov 2019 | - | | 0.812 | Continuing | Continuing | Continuing |
| Systems Engineering MCAC | WR | NAWCAD : Patuxent River, MD | 1.530 | 1.227 | Nov 2017 | 0.665 | Nov 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 28.473 | 33.667 | | 32.317 | | 26.502 | | - | | 26.502 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development TACCOM | SS/FFP | Collins Aerospace : Cedar Rapids, IA | 0.687 | 0.060 | Mar 2018 | 3.021 | Mar 2019 | 1.700 | Mar 2020 | - | | 1.700 | 0.000 | 5.468 | 5.468 |
| Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 0.640 | 0.496 | Nov 2017 | 1.001 | Nov 2018 | 1.020 | Nov 2019 | - | | 1.020 | Continuing | Continuing | Continuing |
| Software Development | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605217N / *(U)Common Avionics* | Project (Number/Name)<br>0572 / *JT Service/NV Std Avionics CP/SB* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Development | Various | Various : Various | 0.000 | 0.300 | Aug 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.300 | - |
| | | **Subtotal** | 1.327 | 0.856 | | 4.022 | | 2.720 | | - | | 2.720 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test and Evaluation | Various | Various : Various | 1.597 | 1.166 | Nov 2017 | 0.221 | Dec 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Developmental Test and Evaluation | WR | NAWCAD : Patuxent River, MD | 1.296 | 1.623 | Nov 2017 | 1.064 | Nov 2018 | 0.731 | Nov 2019 | - | | 0.731 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.893 | 2.789 | | 1.285 | | 0.731 | | - | | 0.731 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contractor Engineering Support | Various | Various : Various | 2.910 | 2.227 | Jan 2018 | 2.805 | Jan 2019 | 2.554 | Jan 2020 | - | | 2.554 | Continuing | Continuing | Continuing |
| Contactor Engineering Support TACCOM | C/CPFF | Precise : Lexington Park, MD | 1.409 | 1.497 | Dec 2017 | 1.812 | Dec 2018 | 1.812 | Dec 2019 | - | | 1.812 | 0.000 | 6.530 | 6.530 |
| Contractor Engineering Support AAT | C/CPFF | Precise : Lexington Park, MD | 1.240 | 1.893 | Dec 2017 | 2.518 | Dec 2018 | 2.442 | Dec 2019 | - | | 2.442 | 0.000 | 8.093 | 8.093 |
| Government Engineering Support | WR | NAWCAD : Patuxent River, MD | 0.302 | 0.575 | Nov 2017 | 0.969 | Nov 2018 | 0.781 | Nov 2019 | - | | 0.781 | Continuing | Continuing | Continuing |
| Government Engineering Support AAT | WR | NAWCAD : Patuxent River, MD | 1.472 | 1.046 | Dec 2017 | 2.296 | Dec 2018 | 2.322 | Nov 2019 | - | | 2.322 | Continuing | Continuing | Continuing |
| Program Management Support | WR | NAWCAD : Patuxent River, MD | 2.559 | 2.694 | Nov 2017 | 3.411 | Nov 2018 | 3.271 | Nov 2019 | - | | 3.271 | Continuing | Continuing | Continuing |
| Program Management Support | Various | Various : Various | 0.044 | 0.040 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

**Management Services ($ in Millions)**

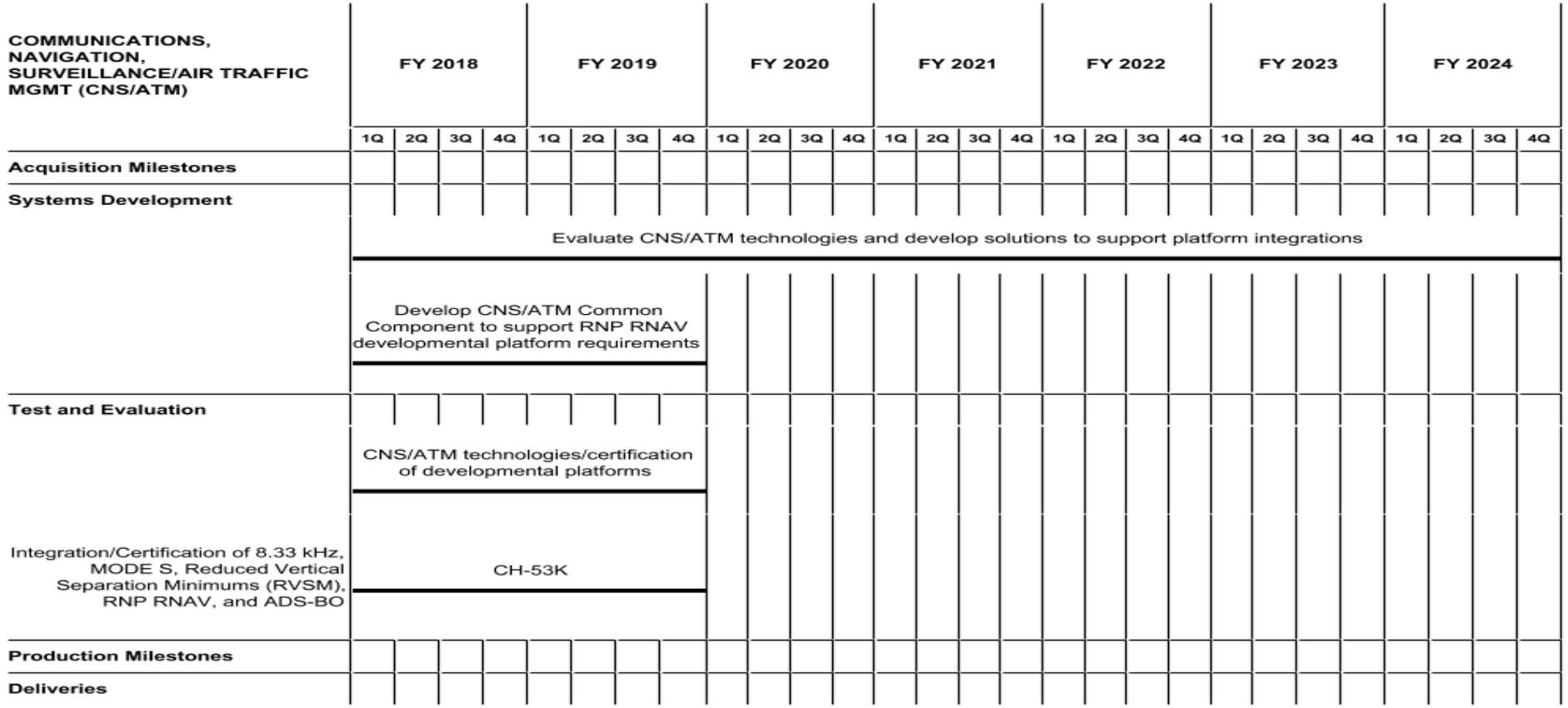
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | WR | NAVAIR : Patuxent River, MD | 0.082 | 0.054 | Feb 2018 | 0.051 | Feb 2019 | 0.052 | Feb 2020 | - | | 0.052 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 10.018 | 10.026 | | 13.862 | | 13.234 | | - | | 13.234 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 42.711 | 47.338 | | 51.486 | | 43.187 | | - | | 43.187 | Continuing | Continuing | N/A |

**Remarks**

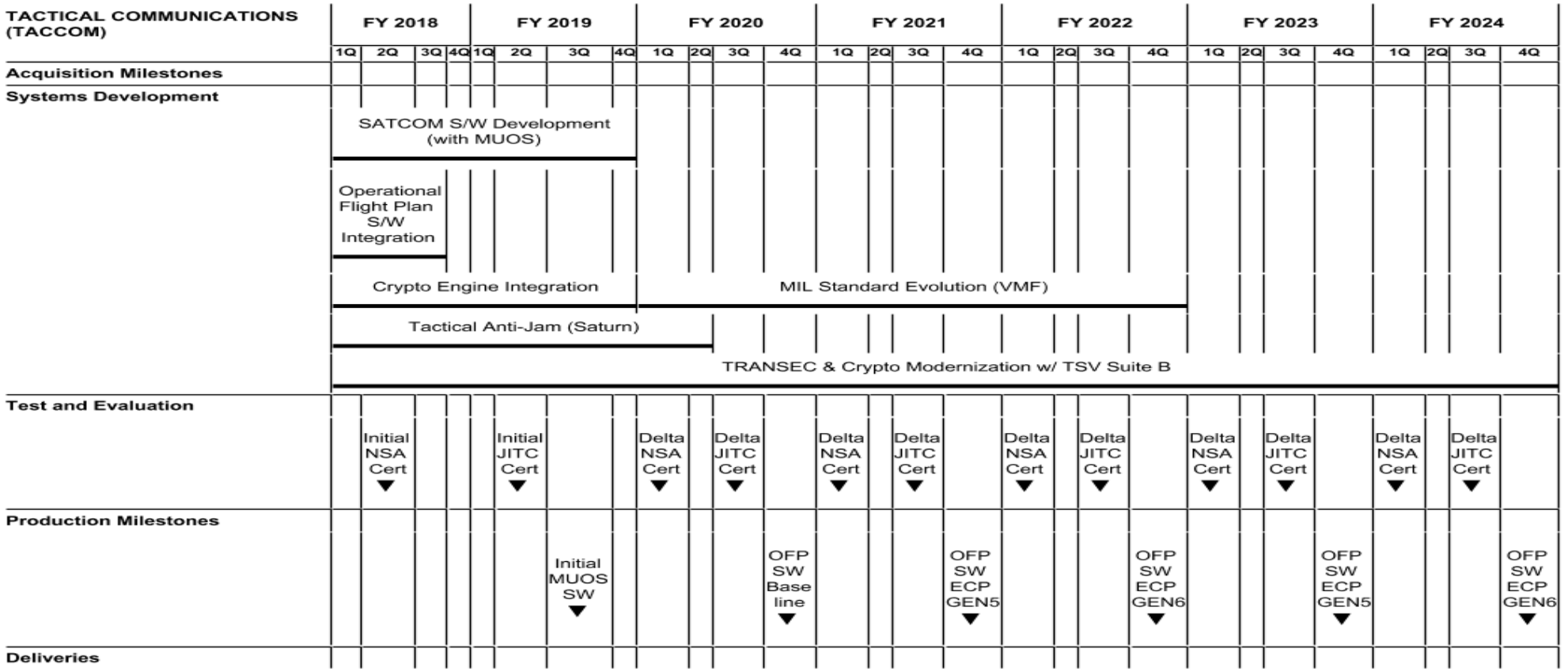
(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |



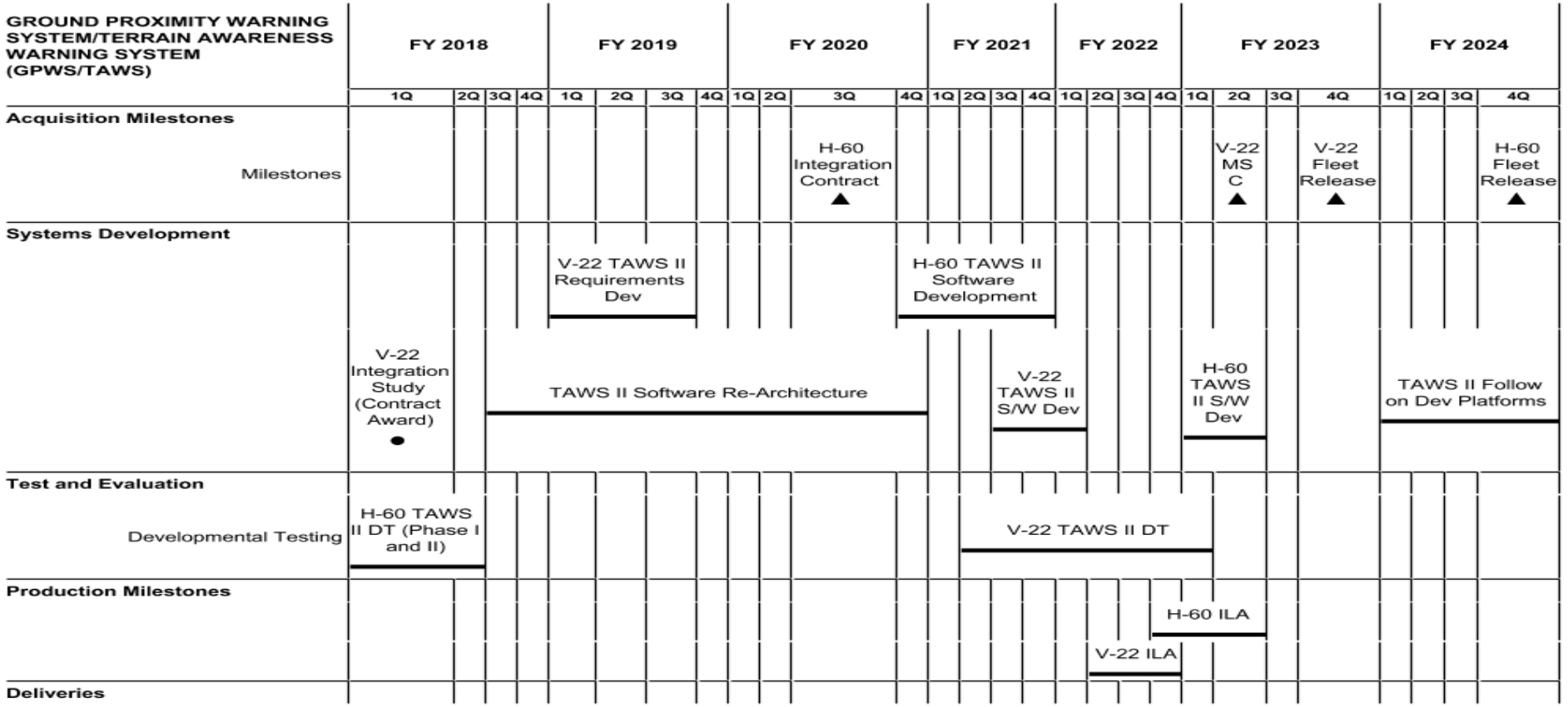

*2020PB - 0605217N - 0572*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |



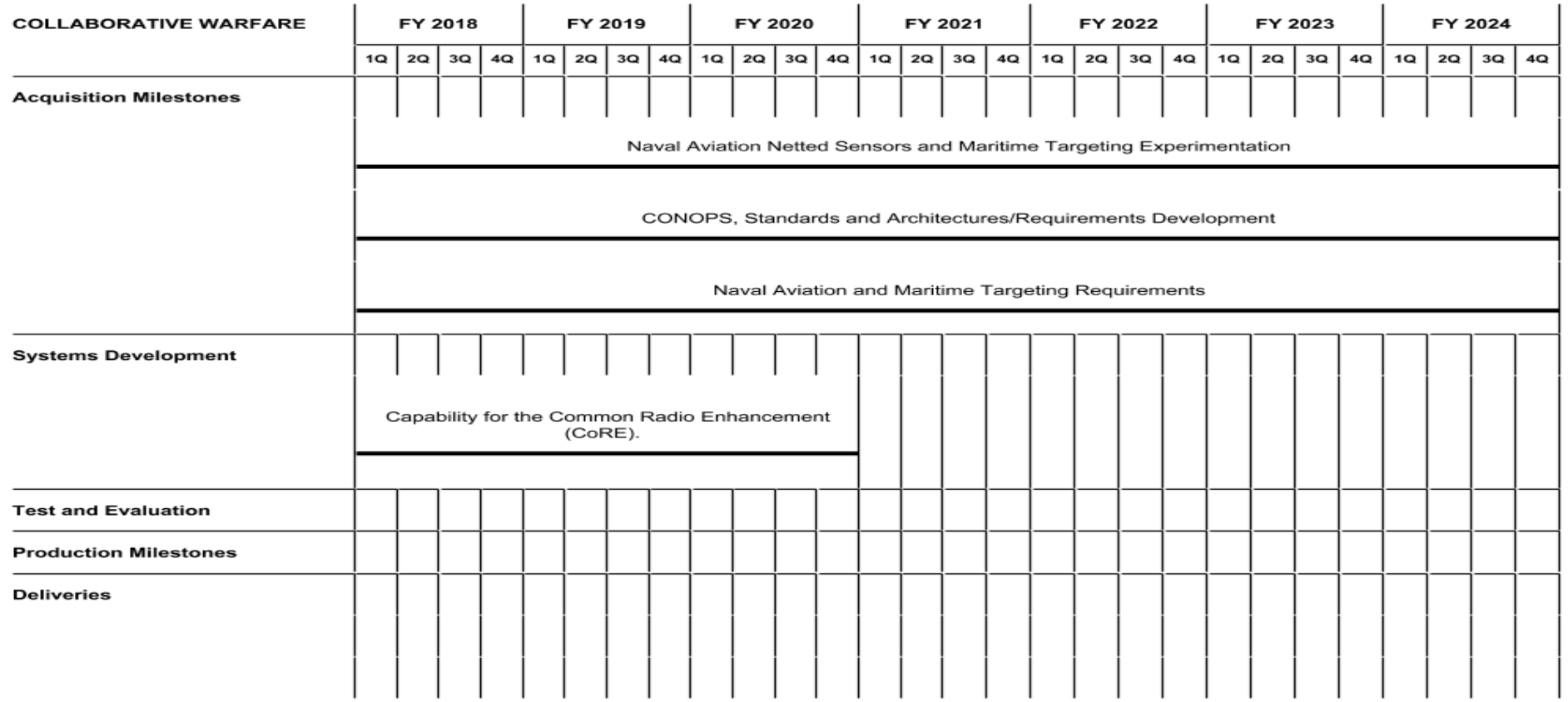

*2020PB - 0605217N - 0572*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |



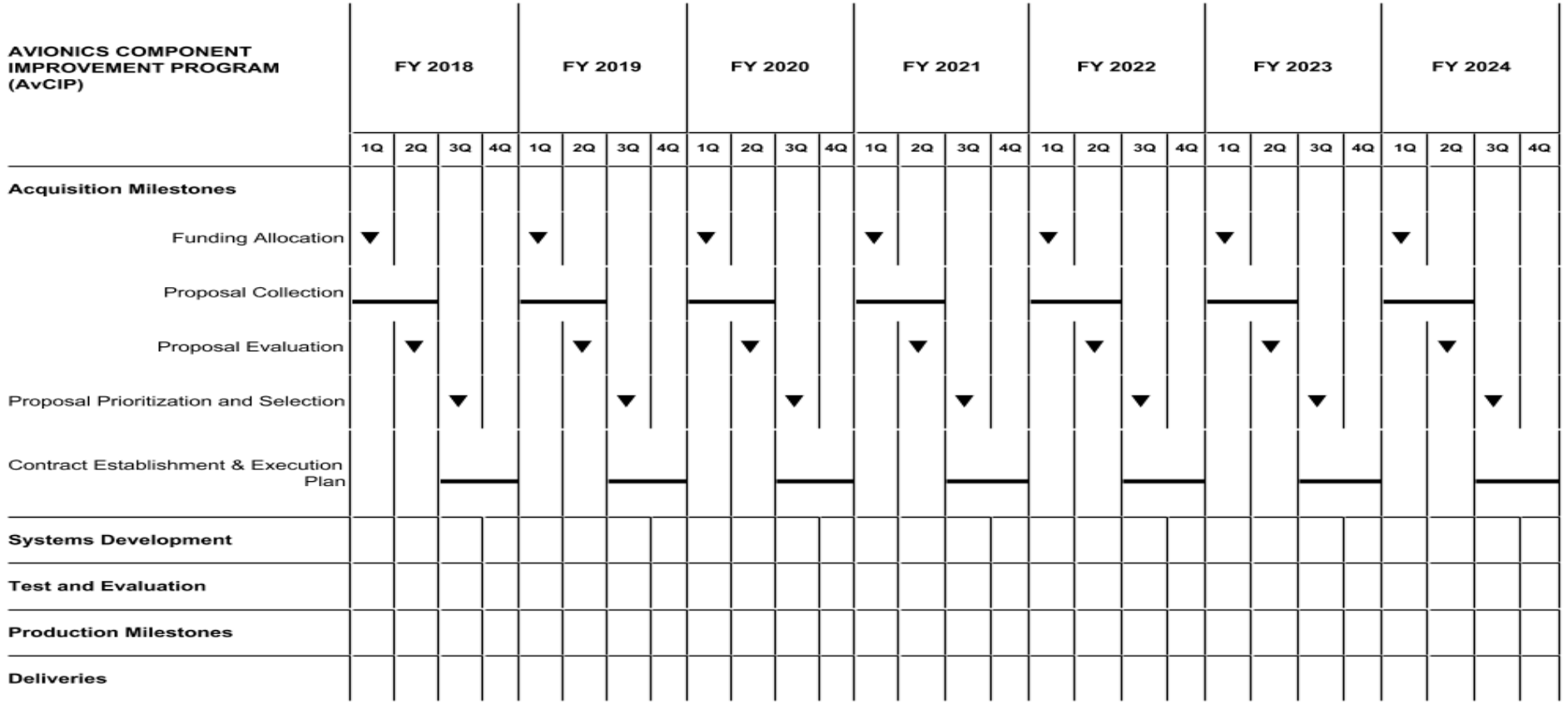

*2020PB - 0605217N - 0572*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |



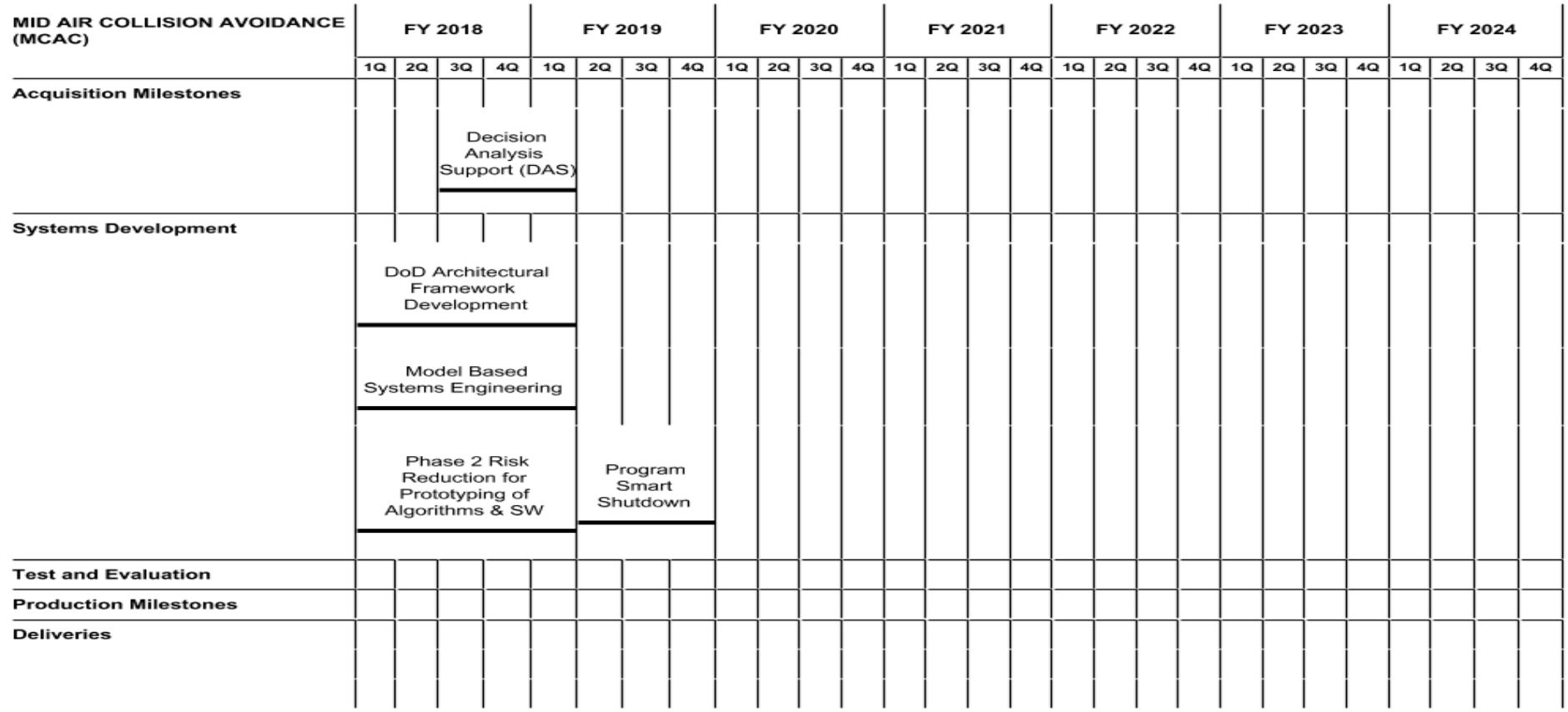

*2020PB - 0605217N - 0572*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |




*2020PB - 0605217N - 0572*

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |




2020PB - 0605217N - 0572

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***COMMUNICATIONS, NAVIGATION, SURVEILLANCE/AIR TRAFFIC MGMT (CNS/ ATM)*** | | | | |
| Systems Development: Evaluate CNS/ATM technologies and develop solutions to support platform integrations | 1 | 2018 | 4 | 2024 |
| Systems Development: Develop CNS/ATM Common Component to support RNP RNAV developmental platform requirements | 1 | 2018 | 4 | 2019 |
| Test and Evaluation: CNS/ATM technologies/certification of developmental platforms | 1 | 2018 | 4 | 2019 |
| Test and Evaluation: Integration/Certification of 8.33 kHz, MODE S, Reduced Vertical Separation Minimums (RVSM), RNP RNAV, and ADS-BO: for CH-53K | 1 | 2018 | 4 | 2019 |
| ***TACTICAL COMMUNICATIONS (TACCOM)*** | | | | |
| Systems Development: GEN5 Integrated Waveform Satellite Communications (SATCOM) S/W Development | 1 | 2018 | 4 | 2019 |
| Systems Development: Operational Flight Plan | 1 | 2018 | 3 | 2018 |
| Systems Development: Crypto Engine Integration | 1 | 2018 | 4 | 2019 |
| Systems Development: MIL Standard Evolution (VMF) | 1 | 2020 | 4 | 2022 |
| Systems Development: Tactical Anti-Jam (Saturn) | 1 | 2018 | 2 | 2020 |
| Systems Development: Transmission Security (TRANSEC) & Crypto Modernization w/ Tactical Secure Voice (TSV) Suite B | 1 | 2018 | 4 | 2024 |
| Test and Evaluation: Initial NSA Cert 2 | 2 | 2018 | 2 | 2018 |
| Test and Evaluation: Initial JITC Cert 2 | 2 | 2019 | 2 | 2019 |
| Test and Evaluation: Delta NSA Cert 3 | 1 | 2020 | 1 | 2020 |
| Test and Evaluation: Delta JITC Cert 3 | 3 | 2020 | 3 | 2020 |
| Test and Evaluation: Delta NSA Cert 1 | 1 | 2021 | 1 | 2021 |
| Test and Evaluation: Delta JITC Cert 4 | 3 | 2021 | 3 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: Delta NSA Cert 4 | 1 | 2022 | 1 | 2022 |
| Test and Evaluation: Delta JITC Cert 5 | 3 | 2022 | 3 | 2022 |
| Test and Evaluation: Delta NSA Cert 5 | 1 | 2023 | 1 | 2023 |
| Test and Evaluation: Delta JITC Cert 6 | 3 | 2023 | 3 | 2023 |
| Test and Evaluation: Delta NSA Cert 6 | 1 | 2024 | 1 | 2024 |
| Test and Evaluation: Delta JITC Cert 7 | 3 | 2024 | 3 | 2024 |
| Production Milestones: Initial MUOS S/W | 3 | 2019 | 3 | 2019 |
| Production Milestones: OFP S/W Baseline | 4 | 2020 | 4 | 2020 |
| Production Milestones: OFP S/W ECP GEN5 3 | 4 | 2023 | 4 | 2023 |
| Production Milestones: OFP S/W ECP GEN6 4 | 4 | 2024 | 4 | 2024 |
| Production Milestones: OFP S/W ECP GEN5 5 | 4 | 2021 | 4 | 2021 |
| Production Milestones: OFP S/W ECP GEN6 6 | 4 | 2022 | 4 | 2022 |
| ***GROUND PROXIMITY WARNING SYSTEM/TERRAIN AWARENESS WARNING SYSTEM (GPWS/TAWS)*** | | | | |
| Acquisition Milestones: Milestones: H-60 Integration Contract | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Milestones: V-22 MS C | 2 | 2023 | 2 | 2023 |
| Acquisition Milestones: Milestones: V-22 Fleet Release | 4 | 2023 | 4 | 2023 |
| Acquisition Milestones: Milestones: H-60 Fleet Release | 4 | 2024 | 4 | 2024 |
| Systems Development: H-60 TAWS II Software Development | 4 | 2020 | 4 | 2021 |
| Systems Development: V-22 TAWS II Requirements Development | 1 | 2019 | 3 | 2019 |
| Systems Development: TAWS II Software Re-Architecture | 3 | 2018 | 4 | 2020 |
| Systems Development: V-22 TAWS II Software Development | 3 | 2021 | 1 | 2022 |
| Systems Development: V-22 CFIT Integration Study | 1 | 2018 | 1 | 2018 |
| Systems Development: H-60 TAWS II Software Development 1 | 1 | 2023 | 2 | 2023 |
| Systems Development: TAWS II Follow on Developmental Platforms | 1 | 2024 | 4 | 2024 |
| Test and Evaluation: Developmental Testing: H-60 TAWS II DT (Phase I and II) | 1 | 2018 | 2 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Test and Evaluation: Developmental Testing: V-22 TAWS II DT | 2 | 2021 | 1 | 2023 |
| Production Milestones: H-60 Integrated Logistics Assessment | 4 | 2022 | 2 | 2023 |
| Production Milestones: V-22 Integrated Logistics Assessment | 2 | 2022 | 4 | 2022 |
| ***COLLABORATIVE WARFARE*** | | | | |
| Acquisition Milestones: Naval Aviation Netted Sensors and Maritime Targeting Experimentation | 1 | 2018 | 4 | 2024 |
| Acquisition Milestones: Netted Sensors CONOPS, Standards and Architectures/ Requirements Development | 1 | 2018 | 4 | 2024 |
| Acquisition Milestones: Naval Aviation and Maritime Targeting Requirements | 1 | 2018 | 4 | 2024 |
| Systems Development: Capability for the Common Radio Enhancement (CoRE) | 1 | 2018 | 4 | 2020 |
| ***AVIONICS COMPONENT IMPROVEMENT PROGRAM (AvCIP)*** | | | | |
| Acquisition Milestones: Funding Allocation: Funding Allocation2 | 1 | 2018 | 1 | 2018 |
| Acquisition Milestones: Funding Allocation: Funding Allocation3 | 1 | 2019 | 1 | 2019 |
| Acquisition Milestones: Funding Allocation: Funding Allocation4 | 1 | 2020 | 1 | 2020 |
| Acquisition Milestones: Funding Allocation: Funding Allocation5 | 1 | 2021 | 1 | 2021 |
| Acquisition Milestones: Funding Allocation: Funding Allocation6 | 1 | 2022 | 1 | 2022 |
| Acquisition Milestones: Funding Allocation: Funding Allocation7 | 1 | 2023 | 1 | 2023 |
| Acquisition Milestones: Funding Allocation: Funding Allocation1 | 1 | 2024 | 1 | 2024 |
| Acquisition Milestones: Proposal Collection: Proposal Collection1 | 1 | 2024 | 2 | 2024 |
| Acquisition Milestones: Proposal Collection: Proposal Collection2 | 1 | 2018 | 2 | 2018 |
| Acquisition Milestones: Proposal Collection: Proposal Collection3 | 1 | 2019 | 2 | 2019 |
| Acquisition Milestones: Proposal Collection: Proposal Collection4 | 1 | 2020 | 2 | 2020 |
| Acquisition Milestones: Proposal Collection: Proposal Collection5 | 1 | 2021 | 2 | 2021 |
| Acquisition Milestones: Proposal Collection: Proposal Collection6 | 1 | 2022 | 2 | 2022 |
| Acquisition Milestones: Proposal Collection: Proposal Collection7 | 1 | 2023 | 2 | 2023 |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation2 | 2 | 2018 | 2 | 2018 |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation3 | 2 | 2019 | 2 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation4 | 2 | 2020 | 2 | 2020 |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation5 | 2 | 2021 | 2 | 2021 |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation6 | 2 | 2022 | 2 | 2022 |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation7 | 2 | 2023 | 2 | 2023 |
| Acquisition Milestones: Proposal Evaluation: Proposal Evaluation8 | 2 | 2024 | 2 | 2024 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection2 | 3 | 2018 | 3 | 2018 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection3 | 3 | 2019 | 3 | 2019 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection4 | 3 | 2020 | 3 | 2020 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection5 | 3 | 2021 | 3 | 2021 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection6 | 3 | 2022 | 3 | 2022 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection7 | 3 | 2023 | 3 | 2023 |
| Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection8 | 3 | 2024 | 3 | 2024 |
| Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan2 | 3 | 2018 | 4 | 2018 |
| Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan3 | 3 | 2019 | 4 | 2019 |
| Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan4 | 3 | 2020 | 4 | 2020 |
| Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan5 | 3 | 2021 | 4 | 2021 |
| Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan6 | 3 | 2022 | 4 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605217N / *(U)Common Avionics* | **Project (Number/Name)**<br>0572 / *JT Service/NV Std Avionics CP/SB* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan7 | 3 | 2023 | 4 | 2023 |
| Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan8 | 3 | 2024 | 4 | 2024 |
| ***MID AIR COLLISION AVOIDANCE (MCAC)*** | | | | |
| Acquisition Milestones: Decision Analysis Support (DAS) | 3 | 2018 | 1 | 2019 |
| Systems Development: DoD Architectural Framework Development | 1 | 2018 | 1 | 2019 |
| Systems Development: Model Based Systems Engineering | 1 | 2018 | 1 | 2019 |
| Systems Development: Phase 2 Risk Reduction for Prototyping of Algorithms & SW | 1 | 2018 | 1 | 2019 |
| Systems Development: Program Smart Shutdown | 2 | 2019 | 4 | 2019 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605220N *I (U)Ship to Shore Connector (SSC)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 366.118 | 31.583 | 1.444 | 4.909 | - | 4.909 | 5.146 | 0.000 | 0.000 | 0.000 | 0.000 | 409.200 |
| 3133: *Ship to Shore Connectors Contract Design* | 8.209 | 8.968 | 1.106 | 2.051 | - | 2.051 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 20.334 |
| 3137: *SSC Construction* | 357.909 | 12.964 | 0.338 | 2.858 | - | 2.858 | 5.146 | 0.000 | 0.000 | 0.000 | 0.000 | 379.215 |
| 9999: *Congressional Adds* | 0.000 | 9.651 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.651 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 303 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

Note: This effort was previously funded under PE 0604567N under projects 3133 and 3137 (FY 2014 and prior).

This PE directly funds and supports the detail design, development, construction, issue resolution, certification, integration and testing of the Ship to Shore Connector (SSC). The lead craft (Craft 100) will be maintained as a test and training platform throughout its life cycle.

SSC is an air-cushioned landing craft intended to transport personnel, weapon systems, equipment, and cargo from amphibious vessels to shore in assault and non-assault operations. The SSC program provides the capability to rapidly move assault forces within the littoral operational environment to accomplish Unified Command Plan (UCP) missions and ensures the Joint Force Commander's (JFCDR's) ability to conduct amphibious operations and operate over the high water mark, including movement over ice, mud, rivers, swamps and marshes. The SSC program provides the functional replacement for the LCAC craft, including Service Life Extension Program(SLEP) which began to degrade below the Required Operational Capability/Projected Operational Environment (ROC/POE) requirement beginning in 2015. SSC addresses this capability gap.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605220N *I (U)Ship to Shore Connector (SSC)* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 22.410 | 1.444 | 2.089 | - | 2.089 |
| Current President's Budget | 31.583 | 1.444 | 4.909 | - | 4.909 |
| Total Adjustments | 9.173 | 0.000 | 2.820 | - | 2.820 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.391 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.436 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 2.875 | - | 2.875 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.055 | - | -0.055 |
| • Congressional Add Adjustments | 10.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Composites Research* | 9.651 | 0.000 |
| Congressional Add Subtotals for Project: 9999 | 9.651 | 0.000 |
| Congressional Add Totals for all Projects | 9.651 | 0.000 |

**Change Summary Explanation**

FY 2020 was increased by $2.875 million for Ship to Shore Connector craft 100 sustainment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>3133 / *Ship to Shore Connectors Contract Design* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3133: *Ship to Shore Connectors Contract Design* | 8.209 | 8.968 | 1.106 | 2.051 | - | 2.051 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 20.334 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 303

**A. Mission Description and Budget Item Justification**

Ship to Shore Connector (SSC) - This project provides the Preliminary and Contract design and Class test efforts for the SSC Program. The SSC program provides the capability to rapidly move assault forces within the littoral operational environment to accomplish Unified Command Plan (UCP) missions and ensures the Joint Force Commander's (JFCDR's) ability to conduct amphibious operations and operate over the high water mark, including movement over ice, mud, rivers, swamps and marshes. SSC provides the functional replacement for the LCAC craft, which begin reaching end of extended service life in 2015. For FY15 and beyond, this project will provide for Class Test and Evaluation of components and systems, as well as all programmatic effort and support activities necessary for the development and execution of Class T&E plans and programs.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Ship to Shore Connectors Contract Design | 8.968 | 1.106 | 2.051 | 0.000 | 2.051 |
| ***Articles:*** | - | - | - | - | - |

***FY 2019 Plans:***

Continue Class T&E Program and preparation for PDT&T.

***FY 2020 Base Plans:***

Commence execution of PDT&T. PDT&T will consist of planning and execution of 27 test events to validate first of class certification and performance requirements, characterize the craft operational envelope, provide confidence to certify the craft readiness for integrated testing and IOT&E, and to verify SSC production and performance to support a Full Rate Production Decision (FRPD). PDT&T tests will support the reliability growth program by conducting 240 hours of on-cushion operations and providing craft level failure data for use with the reliability growth model.

***FY 2020 OCO Plans:***

N/A

***FY 2019 to FY 2020 Increase/Decrease Statement:***

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3133 / *Ship to Shore Connectors Contract Design* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase supports execution of PDT&T events in FY20. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.968 | 1.106 | 2.051 | 0.000 | 2.051 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN 3137: *SSC Construction* | 12.964 | 0.338 | 2.858 | - | 2.858 | 5.146 | 0.000 | 0.000 | 0.000 | 0.000 | 379.215 |
| • SCN 5112: *Ship to Shore Connector* | 529.654 | 517.275 | 0.000 | - | 0.000 | 274.140 | 476.245 | 352.040 | 359.094 | 1,624.090 | 4,654.535 |

**Remarks**

**D. Acquisition Strategy**

The Test and Training craft (Craft 100) and Craft 101 have been executed on contract. Craft 100 was procured and constructed with RDTEN. LCAC 101 was awarded with RDTEN and transferred to SCN for completion. The Detail Design and Construction contract includes options for construction of an additional seven SCN craft, all of which have been awarded (LCAC 102-108). Craft authorized for FY17-19 will be awarded on a new contract.

**E. Performance Metrics**

Continue Operation Testing (Phases C and D)
Continue Follow on SCN Craft Production Testing

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>3133 / *Ship to Shore Connectors Contract Design* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Post Delivery Test & Trials | Various | NSWC PCD : Various | 1.000 | 5.300 | Mar 2019 | 0.823 | May 2019 | 1.200 | Dec 2019 | - | | 1.200 | 0.000 | 8.323 | - |
| Developmental Test & Evaluation | Various | SUPSHIP/ TEXTRON : Various | 0.624 | 0.600 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.224 | - |
| Operational Test & Evaluation | Various | Various : Various | 3.298 | 1.509 | May 2018 | 0.283 | Jul 2019 | 0.851 | Jun 2020 | - | | 0.851 | 0.000 | 5.941 | - |
| Live Fire Test & Evaluation | Various | Various : Various | 3.287 | 1.559 | May 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.846 | - |
| | | **Subtotal** | 8.209 | 8.968 | | 1.106 | | 2.051 | | - | | 2.051 | 0.000 | 20.334 | N/A |

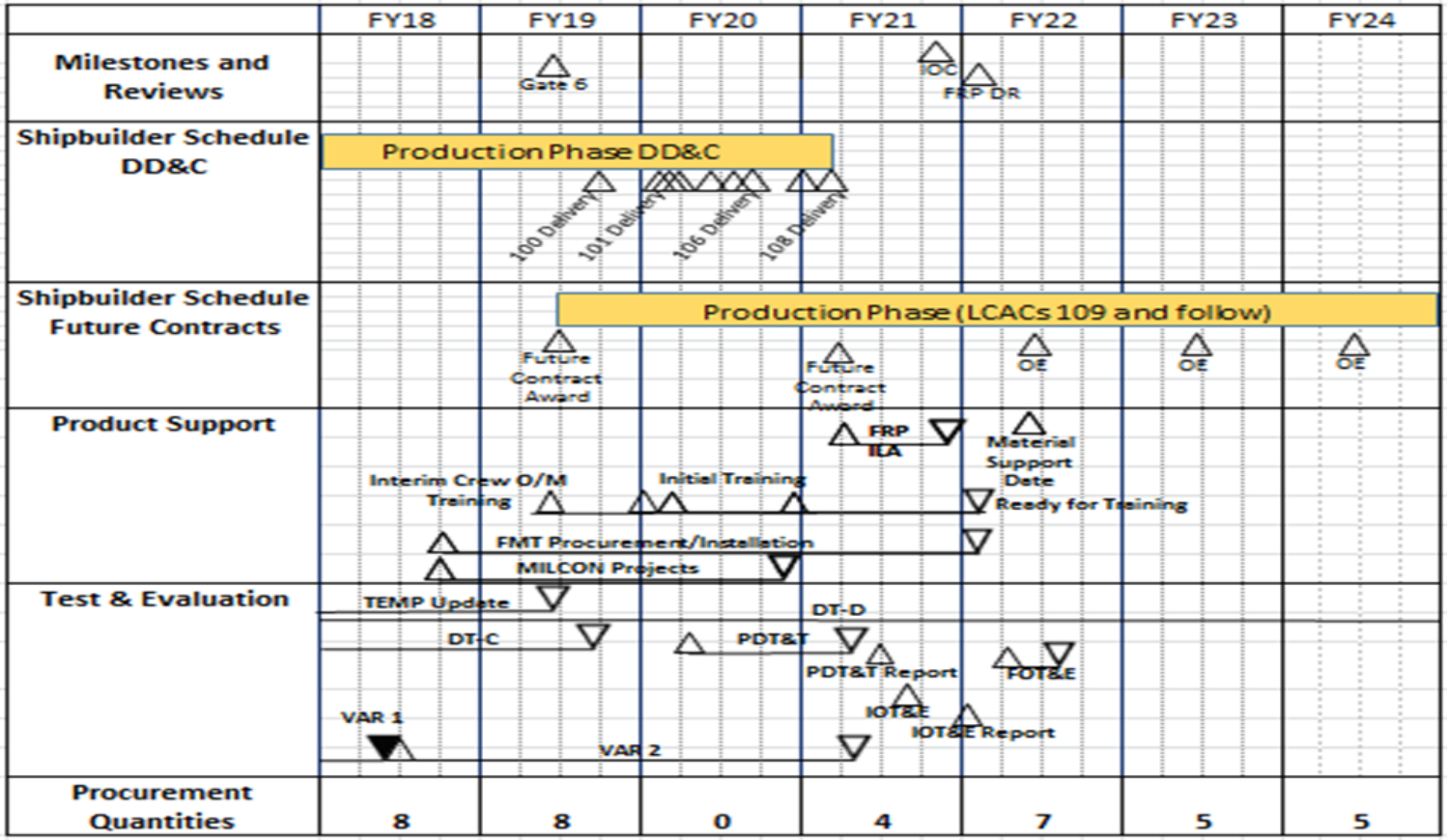
**Remarks**

FY 2020 increase supports readiness for IOT&E.

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 8.209 | 8.968 | | 1.106 | | 2.051 | | - | | 2.051 | 0.000 | 20.334 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3133 / *Ship to Shore Connectors Contract Design* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3133 / *Ship to Shore Connectors Contract Design* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3133*** | | | | |
| Post Delivery Test & Trials (PDT&T) | 2 | 2020 | 2 | 2021 |
| Initial Operational Test and Evaluation (IOT&E) | 3 | 2021 | 4 | 2021 |
| Full Rate Production (FRP) Program Review (PR) | 1 | 2022 | 2 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>3137 / *SSC Construction* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3137: *SSC Construction* | 357.909 | 12.964 | 0.338 | 2.858 | - | 2.858 | 5.146 | 0.000 | 0.000 | 0.000 | 0.000 | 379.215 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 303

**A. Mission Description and Budget Item Justification**

This project funds the Ship to Shore Connector (SSC) Engineering & Manufacturing Development phase which includes Detail Design and Construction, Product Support, Government Furnished Equipment (GFE), Program support, and Outfitting and Post Delivery. The lead craft will be maintained as a test and training platform throughout its life cycle. The SSC program provides the capability to rapidly move assault forces within the littoral operational environment to accomplish Unified Command Plan (UCP) missions, and ensures the Joint Force Commander's (JFCDR's) ability to conduct amphibious operations and operate over the high water mark, including movement over ice, mud, rivers, swamps and marshes. The SSC program provides the functional replacement for the LCAC craft, which began reaching end of extended service life in 2015. Funding for this effort was previously executed under PE 0604567N.

TEST AND TRAINING CRAFT 100 (in $ million):

Plans/Basic Construction:.....255.031 - (FY20 0.000)
Change Orders:.....13.618 - (FY20 0.000)
Electronic:.....8.407 - (FY20 0.000)
HM&E:.....29.823 - (FY20 0.000)
Other Support:.....36.623 - (FY20 0.000)
Ordnance:.....0.008 - (FY20 0.000)
Post Delivery/Outfitting:.....4.000 - (FY20 0.000)
Total:.....347.510 -(FY20 0.000)

NOTE - The SSC Construction project unit prior year column (FY11-17) total funding is $357.909 million for the SSC program. In the prior years FY11-14, the program was funded in PE 0604567N Ship Contract Design/Live Fire T&E. Funds breakout is as follows:

LCAC 100
PE 0604567N 279.863 million FY11-14
PE 0605220N 39.715 million FY15

LCAC 101
PE 0604567N 23.700 million FY13-14

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3137 / *SSC Construction* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** SSC Construction | 12.964 | 0.338 | 2.858 | 0.000 | 2.858 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Deliver Craft 100. Continue Production Support and Test & Evaluation efforts. | | | | | |
| ***FY 2020 Base Plans:***<br>Commence Post Delivery Test and Trials (PDT&T) and associated tasking for Craft 100. Funding provides for the operating crew and maintenance support of SSC test platform at Naval Surface Warfare Center (NSWC) Panama City. This craft is used to test proposed craft changes, Research and Development efforts for LCAC, and the identification and resolution of maintenance issues. | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Funding increase in FY 2020 supports Craft 100 sustainment requirements. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 12.964 | 0.338 | 2.858 | 0.000 | 2.858 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN 3133: *Ship to Shore Connectors Contract Design* | 8.968 | 1.106 | 2.051 | - | 2.051 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 20.334 |
| • SCN 5112: *Ship to Shore Connector* | 529.654 | 517.275 | 0.000 | - | 0.000 | 274.140 | 476.245 | 352.040 | 359.094 | 1,624.090 | 4,654.535 |

**Remarks**

**D. Acquisition Strategy**

The Test and Training craft (Craft 100) and Craft 101 have been executed on contract. Craft 100 will be procured and constructed with RDTEN. LCAC 101 was awarded with RDTEN and transferred to SCN for completion. The Detail Design and Construction contract includes options for construction of an additional seven SCN craft, all of which have been awarded (LCAC 102-108). Craft authorized for FY17-19 will be awarded on a new contract.

**E. Performance Metrics**

Deliver Test and Training Craft 100.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3137 / *SSC Construction* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Trng Craft Ship Design | C/CPFF | Various : Various | 3.804 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.804 | - |
| Test & Trng Craft Detail Design/Construction | C/FPIF | Textron : New Orleans, LA | 30.712 | 5.050 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 35.762 | - |
| Test & Trng Craft Government Furnished Equipment (GFE) | Various | Various : Various | 0.260 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.260 | - |
| Test & Trng Craft Change Orders | C/FPIF | Textron : New Orleans, LA | 7.822 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.822 | - |
| Prior Year - PE 0604567N | Various | Not Specified : Not Specified | 272.356 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 272.356 | - |
| Test & Trng Craft Detail Design/Construction | C/FPIF | NSWC/PCD : Panama City, FL | 0.000 | 0.000 | | 0.000 | | 2.858 | Jan 2020 | - | | 2.858 | 5.183 | 8.041 | - |
| | | **Subtotal** | 314.954 | 5.050 | | 0.000 | | 2.858 | | - | | 2.858 | 5.183 | 328.045 | N/A |

**Remarks**

Change Order total is $13.069. $5.776 is prior to FY15 and is included in Prior Year PE 0604567N total of $272.356. Funding prior to FY15 for GFE, BASIC, and Other are also included in Prior Year PE 0604567N total of $272.356

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Trng Craft Studies and Analysis | Various | Various : Various | 0.322 | 0.835 | Apr 2018 | 0.338 | May 2019 | 0.000 | | - | | 0.000 | 0.000 | 1.495 | - |
| Test & Trng Craft Integrated Logistics Support | WR | NSWC : Various | 3.908 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.908 | - |
| T&T Post Delivery/ Outfitting | Various | SupShip Gulf Coast/ Textron : Various | 0.375 | 3.625 | May 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.000 | - |
| Prior Year - PE 0604567N | Various | Not Specified : Not Specified | 6.149 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.149 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>3137 / *SSC Construction* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 10.754 | 4.460 | | 0.338 | | 0.000 | | - | | 0.000 | 0.000 | 15.552 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Trng Craft Construction Test Program | Various | Various : Various | 1.578 | 3.154 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.732 | - |
| Prior Year - PE 0604567N | Various | Not Specified : Not Specified | 2.268 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.268 | - |
| | | **Subtotal** | 3.846 | 3.154 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.000 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Trng Craft Contractor Engineering Support | C/CPFF | CSC/Alion : Washington, DC | 2.891 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.891 | - |
| Travel | Various | Various : Various | 0.269 | 0.045 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.314 | - |
| Test & Trng Craft Government Engineering Support | WR | Various : Various | 2.407 | 0.255 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.662 | - |
| Prior Year - PE 0604567N | Various | Not Specified : Not Specified | 22.788 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 22.788 | - |
| | | **Subtotal** | 28.355 | 0.300 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 28.655 | N/A |

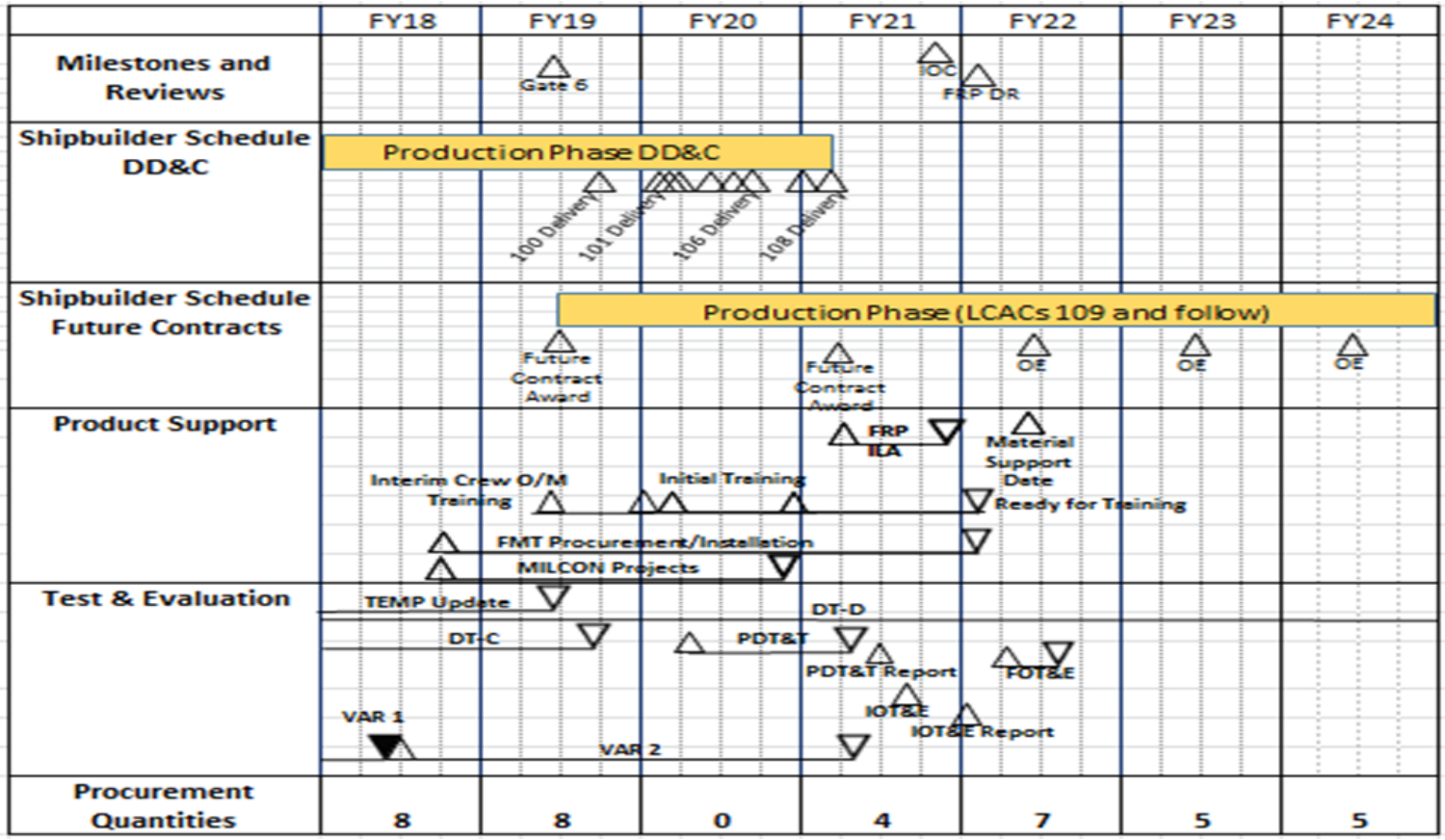
| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 357.909 | 12.964 | | 0.338 | | 2.858 | | - | | 2.858 | 5.183 | 379.252 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>3137 / *SSC Construction* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3137 / *SSC Construction* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>3137 / *SSC Construction* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3137*** | | | | |
| LCAC 100 - Test and Training Craft Delivery | 3 | 2019 | 3 | 2019 |
| Post Delivery Test and Trials (PDT&T) | 2 | 2020 | 2 | 2021 |
| Craft 100 Sustainment | 2 | 2021 | 4 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 9.651 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.651 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Funds for expanded use of composites on SSC Program.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Composites Research | 9.651 | 0.000 |
| ***FY 2018 Accomplishments:*** Initiate detail design and fabrication of SSC composite components. | | |
| ***FY 2019 Plans:*** Continue fabrication and testing of SSC composite components. | | |
| **Congressional Adds Subtotals** | 9.651 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTEN 0605220N C410: *Composite Research* | 9.651 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.651 |

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

Successful prototype testing of SSC composite components.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

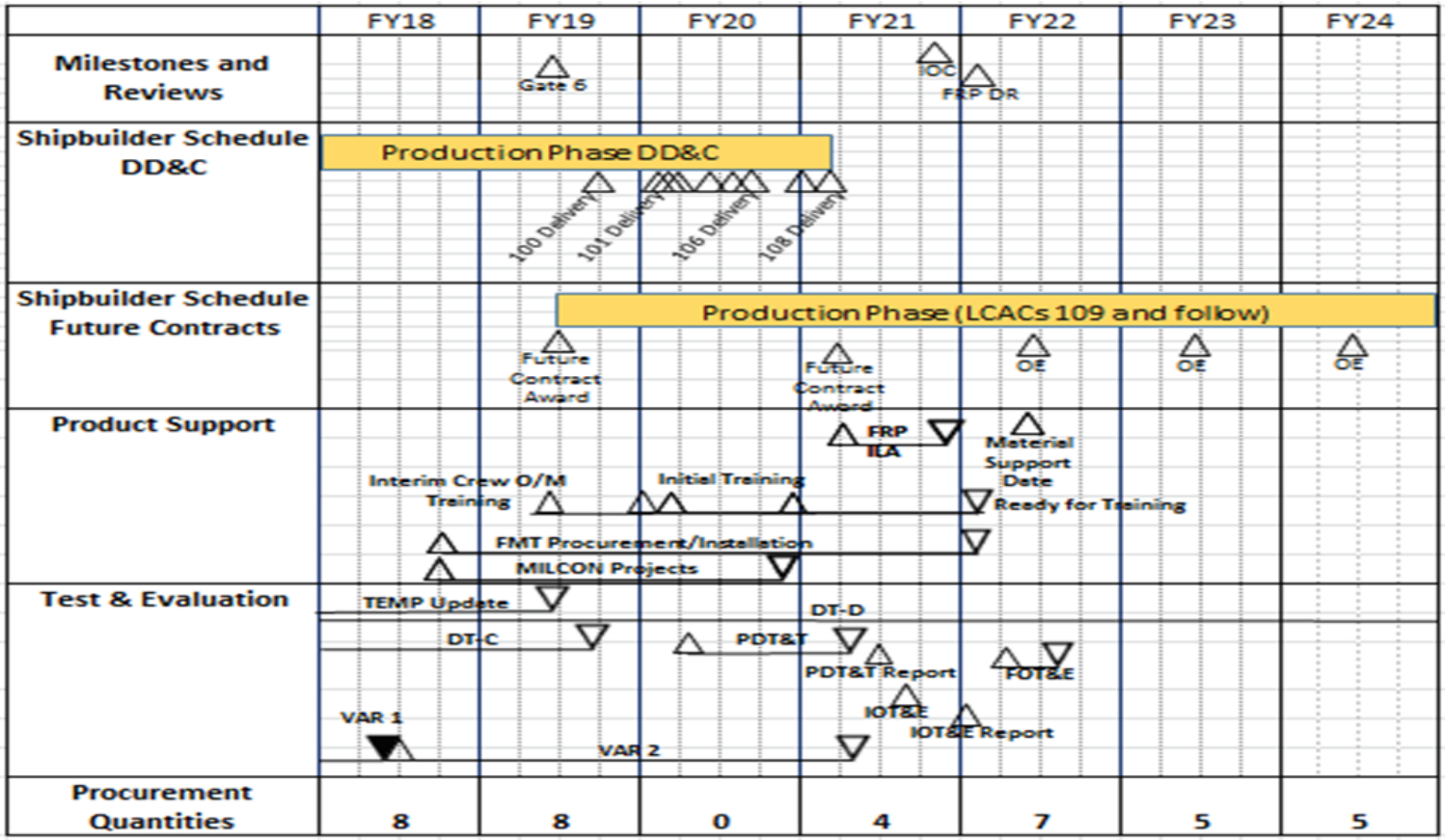
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | Various | NAWC AD : LAKEHURST | 0.000 | 2.000 | Mar 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.000 | - |
| Low Rate Initial Production and Techniques Development | Various | NSWC PCD : VARIOUS | 0.000 | 7.400 | Mar 2019 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.400 | - |
| Development of Composite Repair Procedure and Techniques for Field Repair | Various | NAWC AD : LAKEHURST | 0.000 | 0.251 | Oct 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.251 | - |
| | | **Subtotal** | 0.000 | 9.651 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.651 | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 9.651 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.651 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605220N / *(U)Ship to Shore Connector (SSC)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| Proj C410 Congressional Add: Developmental Test and Evaluation | 4 | 2018 | 2 | 2019 |
| Proj C410 Congressional Add: Low Rate Initial Production and Techniques Development | 1 | 2019 | 2 | 2020 |
| Proj C410 Congressional Add: Development of Composite Repair Procedure and Techniques for Field Repair | 1 | 2019 | 4 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605327N *I (U)T-AO 205 Class* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 1.062 | 1.895 | 1.298 | 1.682 | - | 1.682 | 5.438 | 1.311 | 0.000 | 0.000 | 0.000 | 12.686 |
| 3375: *T-AO 205 Class Development* | 1.062 | 1.895 | 1.298 | 1.682 | - | 1.682 | 5.438 | 1.311 | 0.000 | 0.000 | 0.000 | 12.686 |

**Program MDAP/MAIS Code:**
**Project MDAP/MAIS Code(s):** P452

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $0.722 million to account for the availability of prior year execution balances.

T-AO 205 John Lewis Fleet Oiler Class Test and Evaluation (T&E) in support of recapitalization of the existing T-AO 187 Fleet Oiler Class. The Navy's Combat Logistics Force (CLF) oilers supply fuel and dry cargo to Navy ships at sea. The T-AO 205 Class will operate as shuttle ships from resupply ports to customer ships. Additionally, in conjunction with a T-AKE, they will accompany and stay on-station with a Carrier Strike Group (CSG) to provide fuel as required to customer ships.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 1.961 | 1.298 | 2.407 | - | 2.407 |
| Current President's Budget | 1.895 | 1.298 | 1.682 | - | 1.682 |
| Total Adjustments | -0.066 | 0.000 | -0.725 | - | -0.725 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.066 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.722 | - | -0.722 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.003 | - | -0.003 |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $0.722 million to account for the availability of prior year execution balances.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605327N / *(U)T-AO 205 Class* | Project (Number/Name)<br>3375 / *T-AO 205 Class Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3375: *T-AO 205 Class Development* | 1.062 | 1.895 | 1.298 | 1.682 | - | 1.682 | 5.438 | 1.311 | 0.000 | 0.000 | 0.000 | 12.686 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P452

**A. Mission Description and Budget Item Justification**

T-AO 205 John Lewis Fleet Oiler Class Test and Evaluation (T&E) in support of recapitalization of the existing T-AO 187 Fleet Oiler Class. The Navy's Combat Logistics Force (CLF) oilers supply fuel and dry cargo to Navy ships at sea. The T-AO 205 Class will operate as shuttle ships from resupply ports to customer ships. Additionally, in conjunction with a T-AKE, they will accompany and stay on-station with a Carrier Strike Group (CSG) to provide fuel as required to customer ships.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** T-AO 205 Test and Evaluation | 1.895 | 1.298 | 1.682 | 0.000 | 1.682 |
| ***Articles:*** | - | - | - | - | - |

***FY 2019 Plans:***

Support the execution of the Test and Evaluation Phases DT, OT, and LFT&E per the TEMP. Continue execution of the DT Phase DT-B. FY19 DT-B Test events include Cybersecurity DT, E3 Surveys, and Shipbuilder conducted system verification. Continue development of Test Plans for OT Phase OT-C, Initial Operational Test and Evaluation (IOT&E). Conduct DSBEA. Coordinate efforts with the Shipbuilder, NAVSEA, MSC, PEO Ships, COMOPTEVFOR, JITC and OSD DOT&E.

***FY 2020 Base Plans:***

Support the execution of the Test and Evaluation Phases DT, OT, and LFT&E per the TEMP. Continue execution of the DT Phase DT-B. FY20 DT-B Test events include Cybersecurity DT, Acoustic Trials, Shipboard Electronic System Evaluation Facility (SESEF) Testing, and Shipbuilder conducted system verification. Continue development of Test Plans for OT Phase OT-C, Initial Operational Test and Evaluation (IOT&E). Perform Recoverability Assessment in support of DSBEA. Conduct pre-test efforts in support of Total Ship Survivability Trial (TSST). Coordinate efforts with the Shipbuilder, NAVSEA, MSC, PEO Ships, COMOPTEVFOR, JITC and OSD DOT&E.

***FY 2020 OCO Plans:***

N/A

***FY 2019 to FY 2020 Increase/Decrease Statement:***

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605327N / *(U)T-AO 205 Class* | **Project (Number/Name)**<br>3375 / *T-AO 205 Class Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The increase is due to additional FY20 testing events and additional pre-test efforts to prepare for FY21 events. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 1.895 | 1.298 | 1.682 | 0.000 | 1.682 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SCN/5025: *T-AO 205 Class* | 533.056 | 1,067.599 | 1,057.915 | - | 1,057.915 | 512.561 | 521.570 | 1,101.300 | 559.320 | 6,095.510 | 12,196.100 |

**Remarks**

**D. Acquisition Strategy**

The first Fleet Oiler was awarded in FY16. Fleet oilers will comply with the Oil Pollution Act of 1990 (OPA-90) and International Marine Pollution Regulation (MARPOL) requirements.

**E. Performance Metrics**

None.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605327N / *(U)T-AO 205 Class* | Project (Number/Name)<br>3375 / *T-AO 205 Class Development* |

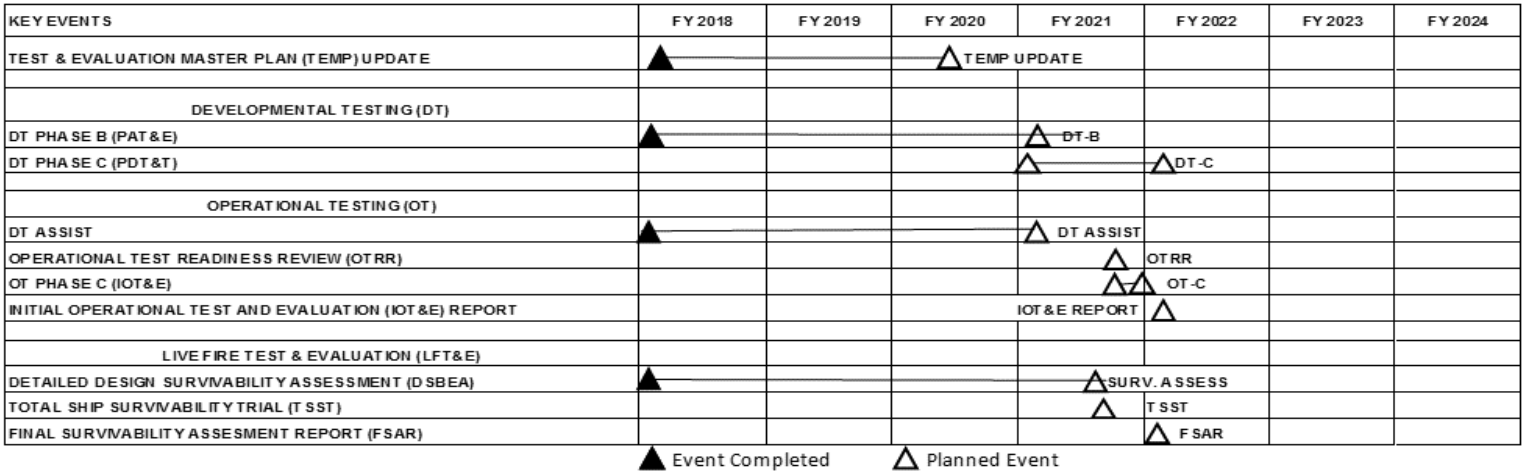
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | Various | Various : Various | 0.340 | 0.566 | Jun 2018 | 0.654 | Dec 2018 | 0.901 | Jan 2020 | - | | 0.901 | 2.009 | 4.470 | - |
| Operational Test & Evaluation | Various | Various : Various | 0.477 | 0.613 | Apr 2018 | 0.140 | Mar 2019 | 0.351 | Jan 2020 | - | | 0.351 | 2.915 | 4.496 | - |
| Live Fire Test & Evaluation | Various | Various : Various | 0.245 | 0.716 | Jan 2018 | 0.504 | Nov 2018 | 0.430 | Jan 2020 | - | | 0.430 | 1.829 | 3.724 | - |
| | | **Subtotal** | 1.062 | 1.895 | | 1.298 | | 1.682 | | - | | 1.682 | 6.753 | 12.690 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1.062 | 1.895 | | 1.298 | | 1.682 | | - | | 1.682 | 6.753 | 12.690 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605327N / *(U)T-AO 205 Class* | **Project (Number/Name)**<br>3375 / *T-AO 205 Class Development* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605327N / *(U)T-AO 205 Class* | **Project (Number/Name)**<br>3375 / *T-AO 205 Class Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3375*** | | | | |
| Test & Evaluation Master Plan (TEMP) Update | 2 | 2018 | 2 | 2020 |
| Developmental Testing (DT): DT Phase B (PAT&E) | 1 | 2018 | 1 | 2021 |
| Developmental Testing (DT): DT Phase C (PDT&T) | 1 | 2021 | 1 | 2022 |
| Operational Testing (OT): DT Assist | 1 | 2018 | 1 | 2021 |
| Operational Testing (OT): Operational Test Readiness Review (OTRR) | 3 | 2021 | 3 | 2021 |
| Operational Testing (OT): OT Phase C (IOT&E) | 3 | 2021 | 4 | 2021 |
| Operational Testing (OT): Initial Operational Test and Evaluation (IOT&E) Report | 1 | 2022 | 1 | 2022 |
| Live Fire Test & Evaluation (LFT&E): Detailed Design Survivability Assessment (DSBEA) | 1 | 2018 | 3 | 2021 |
| Live Fire Test & Evaluation (LFT&E): Total Ship Survivability Trial (TSST) | 3 | 2021 | 3 | 2021 |
| Live Fire Test & Evaluation (LFT&E): Final Survivability Assessment Report (FSAR) | 1 | 2022 | 1 | 2022 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605414N *I (U) Unmanned Carrier Aviation (UCA)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 75.863 | 194.176 | 518.942 | 671.258 | - | 671.258 | 277.674 | 233.761 | 219.331 | 136.568 | Continuing | Continuing |
| 3278: *MQ-25 Development* | 75.863 | 194.176 | 483.915 | 598.968 | - | 598.968 | 218.981 | 191.099 | 189.966 | 119.885 | Continuing | Continuing |
| 3279: *UMCS* | 0.000 | 0.000 | 35.027 | 72.290 | - | 72.290 | 58.693 | 42.662 | 29.365 | 16.683 | Continuing | Continuing |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** P462 | | | | | | | | | | | | |

**Note**

The prime contractor has declared a Loss Contract and thereby invoked Federal Acquisition Regulation clause 32.503-6. Per the clause, a loss ratio factor must be applied to all progress payments to protect the government by ensuring the amount of unliquidated progress payments does not exceed the fair value of undelivered work and will prevent the program from meeting expenditure benchmarks in the near years.

In January of 2016, PE 0605414N PU 3278 was established as the principal budget line for MQ-25. In January of 2018, PU 3279 was established for the Unmanned Carrier Aviation (UCA) Mission Control System (UMCS).

**A. Mission Description and Budget Item Justification**

The MQ-25 program rapidly develops an unmanned capability to embark on Carrier Vessel, Nuclear (CVN) as part of the Carrier Air Wing (CVW) to conduct aerial refueling as a primary mission and provide Intelligence, Surveillance, Reconnaissance (ISR) capability as a secondary mission. MQ-25 extends CVW mission effectiveness range, partially mitigates the current Carrier Strike Group (CSG) organic ISR shortfall and fills the future CVW-tanker gap, mitigating Strike Fighter shortfall and preserving F/A-18E/F Fatigue Life for its primary missions. As the first carrier-based, group 5 Unmanned Aircraft System (UAS), MQ-25 will pioneer the integration of manned and unmanned operations, demonstrate mature complex sea-based Command, Control, Communications, Computers, and Intelligence (C4I) UAS technologies, and pave the way for future multifaceted multi-mission UAS to pace emerging threats.

MQ-25 requirements are aligned with the Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) Initial Capabilities Document (ICD) and the Next Generation Air Dominance (NGAD) Family of Systems (FoS) ICD, which highlight the need for carrier-based refueling and persistent ISR capabilities. The Joint Requirements Oversight Council (JROC) endorsed the UCLASS ICD in April 2011 and formally approved it on 9 Jun 11 via Joint Requirements Oversight Council Memorandum (JROCM) 087-11. The NGAD FoS ICD was validated by the JROC on 18 August 2015 and formally approved by JROCM 087-15. The JROC's guidance delineated in the validated ICDs and subsequent JROCMs was to establish a requirement for a versatile platform that supports a myriad of organic Naval missions such as aerial refueling and ISR to support the CVW. The JROC validated the Capability Development Document for MQ-25 Carrier Based Unmanned Air System on 21 July 2017. After contract award in 2018, an opportunity to accelerate Initial Operational Capability (IOC) to 2024 was recognized, and the Navy decided to make the investments required to capture that opportunity by increasing the number of test carrier installs to four and funding System Demonstration Test Article (SDTA) production to start in FY20.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605414N *I (U) Unmanned Carrier Aviation (UCA)* |

The Unmanned Carrier Aviation (UCA) Mission Control System (UMCS) program consists of the MQ-25 control station, designated the MD-5, and modifications to the C4I systems and CVN infrastructure required for MQ-25 vehicle and mission control.

This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 222.208 | 718.942 | 705.972 | - | 705.972 |
| Current President's Budget | 194.176 | 518.942 | 671.258 | - | 671.258 |
| Total Adjustments | -28.032 | -200.000 | -34.714 | - | -34.714 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -200.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.311 | 0.000 | | | |
| • SBIR/STTR Transfer | -4.731 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -31.495 | - | -31.495 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -3.219 | - | -3.219 |
| • Congressional Directed Reductions Adjustments | -22.990 | - | - | - | - |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $26.320 million to account for the availability of prior year execution balances.

The FY 2020 funding request was reduced due to MQ-25 contract savings.

Technical: Increase in test carriers from two to four in order to ensure sufficient underway testing to achieve the accelerated Initial Operational Capability (IOC) for the MQ-25 in FY24.

Schedule: IOC accelerated to 2024.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | Project (Number/Name)<br>3278 / *MQ-25 Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3278: *MQ-25 Development* | 75.863 | 194.176 | 483.915 | 598.968 | - | 598.968 | 218.981 | 191.099 | 189.966 | 119.885 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | 4 | 3 | - | 3 | - | - | - | - | | |

**Project MDAP/MAIS Code:** P462

**A. Mission Description and Budget Item Justification**

The MQ-25 program rapidly develops an unmanned capability to embark on CVNs as part of the Carrier Air Wing (CVW) to conduct aerial refueling as a primary mission and provide Intelligence, Surveillance, Reconnaissance (ISR) capability as a secondary mission. MQ-25 extends CVW mission effectiveness range, partially mitigates the current Carrier Strike Group (CSG) organic ISR shortfall and fills the future CVW-tanker gap, mitigating Strike Fighter shortfall and preserving F/A-18E/F Fatigue Life for its primary missions. As the first carrier-based, group 5 Unmanned Aircraft System (UAS), MQ-25 will pioneer the integration of manned and unmanned operations, demonstrate mature complex sea-based Command, Control, Communications, Computers, and Intelligence (C4I) UAS technologies, and pave the way for future multifaceted multi-mission UAS to pace emerging threats.

MQ-25 requirements are aligned with the Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) Initial Capabilities Document (ICD) and the Next Generation Air Dominance (NGAD) Family of Systems (FoS) ICD, which highlight the need for carrier-based refueling and persistent ISR capabilities. The Joint Requirements Oversight Council (JROC) endorsed the UCLASS ICD in April 2011 and formally approved it on 9 Jun 11 via Joint Requirements Oversight Council Memorandum (JROCM) 087-11. The NGAD FoS ICD was validated by the JROC on 18 August 2015 and formally approved by JROCM 087-15. The JROC's guidance delineated in the validated ICDs and subsequent JROCMs was to establish a requirement for a versatile platform that supports a myriad of organic Naval missions such as aerial refueling and ISR to support the CSG. The JROC validated the Capability Development Document (CDD) for MQ-25 Carrier Based Unmanned Air System (CBUAS) on 21 July 2017. After contract award in 2018, an opportunity to accelerate Initial Operational Capability (IOC) to 2024 was recognized, and the Navy decided to make the investments required to capture that opportunity by increasing the number of test carrier installs to four and funding System Demonstration Test Article (SDTA) production to start in FY20.

MQ-25 will be designed to conduct aerial refueling and ISR missions. MQ-25 will have the ability to refuel all carrier based fixed wing aircraft capable of aerial refueling and to pass sensor data to other aircraft, naval vessels, and ground forces. Sensor data will be transmitted at appropriate classification levels, to exploitation nodes afloat and ashore (e.g. Distributed Common Ground System - Navy). The MQ-25 system will be sustainable onboard an aircraft carrier, as well as ashore, and will be designed to minimize the logistics footprint of the current CVW.

MQ-25 will achieve these capabilities through the use of a carrier-suitable, semi-autonomous, unmanned Air Segment and the UCA Mission Control System (UMCS) that provides CVN infrastructure modifications and hardware to support MQ-25 operations aboard all NIMITZ class carriers (except CVN 68), all delivered and planned FORD class carriers, and operational shore sites. The Government will perform Lead Systems Integration (LSI), providing government-led system of systems integration for the MQ-25 Program. The program will coordinate across all segments and with external stakeholders to ensure program activities are synchronized. MQ-25 will interface with existing ship and land-based command and control systems, including ISR Tasking, Collection, Processing, Exploitation, and Dissemination systems.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

The scope of the program includes, but is not limited to, system level requirements identification, allocation of requirements to segments and components, design, development, integration, fabrication, test, training, and support activities to provide the MQ-25 capabilities. To accomplish these capabilities, MQ-25 will transition (as required) technologies from other programs and adapt them into the carrier environment. MQ-25 will deliver the necessary air vehicles, command, control, connectivity, shipboard and land-based launch and recovery control systems, associated support systems, interfaces, and upgrades to other Navy systems (as required) to meet the required capabilities.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Air Segment Product Development | 87.882 | 387.251 | 484.728 | 0.000 | 484.728 |
| ***Articles:*** | - | 4 | 3 | - | 3 |
| ***Description:*** Air Segment Product Development efforts include, but are not limited to, design, development, integration, fabrication, test and training to deliver a carrier-suitable, semi-autonomous, unmanned vehicle capable of aerial refueling (give) and persistent Intelligence, Surveillance, and Reconnaissance (ISR) operations.<br><br>***FY 2019 Plans:***<br>Continue to perform Air System Engineering and Manufacturing Development contract activities. Continue Air Segment system integration and interface development activities and complete System Design Review. Begin design and fabrication of Air Vehicle subsystem and begin assembly of Air Vehicles.<br><br>***FY 2020 Base Plans:***<br>Continue to perform Air Segment system integration and interface development activities. Continue design and fabrication of Air Vehicle subsystem and begin assembly of Air Vehicles. Complete three (3) Hardware in the Loop labs and one (1) Ironbird to stand up government and contractor System Integration Labs. Complete software qualifications, begin contractor testing, conduct Test Readiness Review, and complete test preparations for first flight in FY21. Exercise option for System Demonstration Test Articles (SDTA). Continue EMD Studies and Analysis.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in FY 2020 due to procuring SDTA aircraft, conducting engineering analysis to support System Design Review, and initiating assembly of four Engineering Development Models (EDM) vehicles. | | | | | |
| ***Title:*** Control System & Connectivity (CS&C) Segment Product Development | 29.116 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Description:*** CS&C Segment Product Development is a Government-led effort which includes, but is not limited to, the hardware, software, and networks needed to establish interfaces and upgrades to existing ship and land-based command and control systems. For FY19 and beyond, this effort is captured under PU 3279.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Carrier (CVN) Segment Product Development<br>***Articles:***<br>***Description:*** CVN Segment Product Development is a Government-led effort which includes, but is not limited to, upgrades to existing CVN infrastructure to support accelerated delivery MQ-25 capabilities, unique modifications to the Joint Precision Approach Landing System (JPALS) beyond the existing Program of Record (PoR), modifications to Aircraft Launch and Recovery Equipment (ALRE) to support specific MQ-25 capabilities, and integration with C4I systems. For FY19 and beyond, this effort is captured under PU 3279.<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | 24.348<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- | 0.000<br>- |
| ***Title:*** Lead Systems Integration (LSI) Product Development<br>***Articles:***<br>***Description:*** Lead Systems Integration (LSI) is a Government-led effort including, but not limited to, advanced development, architecture development, interface definition, integration, system level test and evaluation, | 29.692<br>- | 48.264<br>- | 54.648<br>- | 0.000<br>- | 54.648<br>- |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| science and technology investments, roadmap refinement, and coordination of all MQ-25 capabilities across system segments and stakeholders.<br><br>***FY 2019 Plans:***<br>Continue to perform Air Segment and UCA Mission Control System (UMCS) development, design, integration, interface, cyber security risk management framework, architecture refinement and modification activities. Continue fabrication and operation of the Systems Test and Integration Lab (STIL) and test facilities in support of government-led development and test program activities, including implementation of open system architectures. Connect to air system contractor system integration laboratories and begin combined contractor and government integration activities. Conduct and support flight test activities at contractor facilities. Conduct and support laboratory tests in support of EMD aircraft systems.<br><br>***FY 2020 Base Plans:***<br>Continue to perform Air Segment and UMCS development, design, and integration. Continue Cyber Security efforts to achieve Authority to Operate (ATO) certifications for the System Test Integration Lab (STIL), the Lab Revitalization Program (LRP), and test facilities. Continue operation of the STIL in support of government led hardware & software development and test activities. Procure LRP infrastructure communications and telemetry hardware to support test activities. Continue government and contractor STIL integration activities in support of software verification and validation. Conduct and support flight test activities at contractor facilities. Conduct and support laboratory tests in support of EMD aircraft systems.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>LSI Funding increase from FY19 to FY20 due to increased integration and test activities associated with incorporating Air Vehicle design into MQ-25 system of systems architecture. Additionally, the funding supports the connection to air system contractor system integration laboratories and continue combined contractor and government integration activities. FY20 funding supports the procurement of LRP infrastructure communications and telemetry hardware to support test activities. | | | | | |
| ***Title:*** Management | 6.495 | 6.538 | 6.630 | 0.000 | 6.630 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Efforts include program, engineering, test, and logistics management. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>Continue oversight, coordination, and management of MQ-25 acquisition, system interface and integration activities. Oversee contract activities, including execution of the Air System Engineering, Manufacturing and Development (EMD) contract. Conduct logistics management tasks. Maintain security and program office environments.<br>***FY 2020 Base Plans:***<br>Continue oversight, coordination, and management of MQ-25 acquisition, system interface and integration activities. Oversee contract activities, including execution of the Air System Engineering, Manufacturing and Development (EMD) contract. Conduct logistics management tasks. Maintain security and program office environments.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No significant change from FY 2019 to FY 2020 | | | | | |
| ***Title:*** Test and Evaluation | 14.092 | 38.743 | 49.403 | 0.000 | 49.403 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Provide Government Integrated testing and evaluation, Performance Based Specifications (PBS) compliance verification, support equipment evaluations/assessments, instrumentation development/support, and Integrated Test support.<br>***FY 2019 Plans:***<br>Continue to support development and implementation of test facilities, range, and lab test requirements. Support updates to the Test and Evaluation Master Plan (TEMP), support engineering events, and program management activities. Support surrogate test activities for landing systems demonstrations. Support activities in Modeling and Simulation development to include validation and verification. Continue support of the Government Systems Test & Integration Lab (STIL) and continue stand up of the integrated test facilities in support of the Engineering & Manufacturing Development (EMD) contract, to include test facility installation, integration, and accreditation activities.<br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue to support development and implementation of test facilities, range, and lab test requirements. Support updates to the Test and Evaluation Master Plan (TEMP), support engineering events, and program management activities. Support surrogate test activities for landing systems demonstrations. Support activities in Modeling and Simulation development to include validation and verification. Continue support of the Government Systems Test & Integration Lab (STIL) and continue stand up of the integrated test facilities in support of the Engineering & Manufacturing Development (EMD) contract, to include test facility installation, integration, procurement of support equipment and accreditation activities. Provide government engineering to support contractor testing in preparation of first flight in FY21.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Test and Evaluation funding increase from FY19 to FY20 supports the procurement and outfitting of mission and support equipment associated with the integrated test facilities and additional government engineering to support contractor testing in preparation of first flight in FY21. | | | | | |
| ***Title:*** Support | 2.551 | 3.119 | 3.559 | 0.000 | 3.559 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Efforts include studies, analyses, and training development support.<br>***FY 2019 Plans:***<br>Continue to perform logistics supportability studies and analyses, modeling and simulation efforts. Continue development efforts of training tools for the Fleet, and development of manpower and training assessments, to support EMD contract award and timeline.<br>***FY 2020 Base Plans:***<br>Continue to perform logistics supportability studies and analyses, modeling and simulation efforts. Continue development efforts of training tools for the Fleet, and development of manpower and training assessments, to support EMD contract and timeline.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Increase from FY19 to FY20 due to prototype Mission System Trainer development at the Systems Integration Lab. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 194.176 | 483.915 | 598.968 | 0.000 | 598.968 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 4269/0204112N: *UMCS-UNMAN CARRIER AVIATION (UCA) MISSION CNTRL STN* | 0.000 | 18.019 | 32.668 | - | 32.668 | 60.431 | 67.000 | 72.948 | 83.329 | Continuing | Continuing |
| • 0449/0305205N: *MQ-25* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 53.435 | 725.904 | 680.718 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Based on the Government's acquisition strategy approved in April 2017, the MQ-25 program is an evolution from the previous Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) program and is an Acquisition Category (ACAT) IB program managed by Program Executive Office, Unmanned Aviation & Strike Weapons (PEO(U&W)), PMA-268 Unmanned Carrier Aviation (UCA) Program Office. Pursuant to 10 U.S.C. 2430(d)(1), the Milestone Decision Authority (MDA) is ASN(RDA).

The MQ-25 system will enhance carrier (CVN) capability and versatility for the Joint Forces Commander through the integration of a persistent, sea-based, multi-mission aerial refueling and reconnaissance Unmanned Aircraft System (UAS) into the Carrier Air Wing (CVW). MQ-25 is comprised of an Air Segment (AS) and the UCA Mission Control System (UMCS). These architectural segments will be managed by the PMA-268 Government Lead Systems Integrator (LSI) that provides system-of-systems integration and is also responsible for managing enterprise-level UCA architecture and associated interfaces.

MQ-25 will use an evolutionary acquisition strategy to develop, fly, deploy, and evolve an Initial Operational Capability system for fleet integration. This MQ-25 acquisition strategy will support the development of the MQ-25 AS, supporting control and connectivity systems, and CVN modifications required for entry into Engineering & Manufacturing Development (EMD) in 2018 with an objective IOC of 2024.

MQ-25 awarded a fixed price incentive, firm target (FPIF) contract for the AS EMD contract to Boeing in Aug 2018.

**E. Performance Metrics**

Meet Navy operational requirements as defined in requirements documents.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | Project (Number/Name)<br>3278 / *MQ-25 Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Air Segment - Primary Hardware Development | C/FPIF | Boeing : St. Louis, MO | 0.000 | 82.893 | Aug 2018 | 347.000 | Oct 2018 | 375.400 | Oct 2019 | - | | 375.400 | 0.000 | 805.293 | 805.300 |
| Air Segment - Primary Hardware SDTA | C/FPIF | Boeing : St. Louis, MO | 0.000 | 0.000 | | 0.000 | | 63.500 | Oct 2019 | - | | 63.500 | 21.200 | 84.700 | 84.700 |
| Air Segment - Primary Hardware ESA | C/CPIF | Boeing : St. Louis, MO | 0.000 | 0.000 | | 20.000 | Oct 2018 | 20.000 | Oct 2019 | - | | 20.000 | 40.000 | 80.000 | 80.000 |
| Air Segment - Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.000 | 4.422 | Nov 2017 | 17.673 | Nov 2018 | 23.238 | Nov 2019 | - | | 23.238 | Continuing | Continuing | Continuing |
| Air Segment - Systems Engineering | WR | NAWCWD : China Lake, CA | 0.000 | 0.324 | Nov 2017 | 1.330 | Nov 2018 | 1.337 | Nov 2019 | - | | 1.337 | Continuing | Continuing | Continuing |
| Air Segment - Systems Engineering | Various | Various : Various | 0.000 | 0.243 | Mar 2018 | 1.248 | Mar 2019 | 1.253 | Nov 2019 | - | | 1.253 | Continuing | Continuing | Continuing |
| CS&C Segment | WR | NAWCAD : Patuxent River, MD | 14.605 | 9.052 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 23.657 | - |
| CS&C Segment | Various | Various : Various | 4.696 | 4.649 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 9.345 | - |
| CS&C Segment | Various | NSMA : Arlington, VA | 0.655 | 0.388 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.043 | - |
| CS&C Segment | WR | SPAWAR : San Diego, CA | 6.180 | 4.282 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.462 | - |
| CS&C Segment (Comms, Intel, Network) | Various | Various : Various | 2.459 | 4.049 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.508 | - |
| CS&C Segment (CPS/ CDS) | Various | Various : Various | 1.200 | 6.696 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.896 | - |
| Carrier Segment (Ship Integration) | Various | Various : Various | 0.319 | 0.648 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.967 | - |
| Carrier Segment (Ship Integration) | WR | NAWCAD : Patuxent River, MD | 14.685 | 17.740 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 32.425 | - |
| Carrier Segment (Ship Integration) | WR | NAWCAD : Lakehurst, NJ | 1.386 | 2.177 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.563 | - |
| Carrier Segment | SS/FFP | Rockwell Collins : Cedar Rapids, IA | 0.000 | 1.970 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.970 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | Project (Number/Name)<br>3278 / *MQ-25 Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carrier Segment | WR | SPAWAR : San Diego, CA | 2.144 | 1.813 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 3.957 | - |
| LSI - Advanced Development (Primary Hardware Development) | Various | NSMA : Arlington, VA | 0.151 | 0.183 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.334 | - |
| LSI - Advanced Development (Primary Hardware Development) | WR | NAWCAD : Patuxent River, MD | 0.509 | 0.189 | Dec 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.698 | - |
| LSI - Advanced Development (Primary Hardware Development) | WR | NAWCWD : China Lake, CA | 0.240 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.240 | - |
| LSI - Systems Engineering | Various | Various : Various | 2.888 | 2.046 | Dec 2017 | 5.918 | Dec 2018 | 5.548 | Nov 2019 | - | | 5.548 | Continuing | Continuing | Continuing |
| LSI - Systems Engineering | WR | NAWCAD : Patuxent River, MD | 9.301 | 20.577 | Dec 2017 | 34.666 | Dec 2018 | 41.391 | Nov 2019 | - | | 41.391 | Continuing | Continuing | Continuing |
| LSI - Systems Engineering | Various | SPAWAR : San Diego, CA | 1.576 | 2.535 | Nov 2017 | 3.640 | Nov 2018 | 3.510 | Nov 2019 | - | | 3.510 | Continuing | Continuing | Continuing |
| LSI - Integrated Digital Environment | SS/FFP | NAWCAD : Lakehurst, NJ | 0.000 | 4.162 | May 2018 | 4.040 | Mar 2019 | 4.199 | Mar 2020 | - | | 4.199 | 0.000 | 12.401 | - |
| | | **Subtotal** | 62.994 | 171.038 | | 435.515 | | 539.376 | | - | | 539.376 | Continuing | Continuing | N/A |

**Remarks**

Control System and Connectivity (CS&C)
Navy Systems Management Activity (NSMA)
Common Display System (CDS)
Common Processing System (CPS)
Lead Systems Integration (LSI)
Engineering and Manufacturing Development (EMD)
Integrated Digital Environment (IDE)

Air Segment - Increase due to procuring SDTA aircraft, conducting engineering analysis to support System Design Review, and initiating assembly of four EDM vehicles.

LSI-Systems Engineering - Funding increase from FY19 to FY20 due to increased integration and test activities associated with incorporating Air Vehicle design into MQ-25 system of systems architecture. Connect to air system contractor system integration laboratories and continue combined contractor and government integration activities. Procure LRP infrastructure communications and telemetry hardware to support test activities.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | Project (Number/Name)<br>3278 / *MQ-25 Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manpower Studies & Analyses | Various | Various : Various | 0.106 | 0.113 | Nov 2017 | 0.115 | Nov 2018 | 0.156 | Nov 2019 | - | | 0.156 | Continuing | Continuing | Continuing |
| Training Development | Various | Various : Various | 1.197 | 2.438 | Dec 2017 | 3.004 | Dec 2018 | 3.403 | Nov 2019 | - | | 3.403 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.303 | 2.551 | | 3.119 | | 3.559 | | - | | 3.559 | Continuing | Continuing | N/A |

**Remarks**

Training Development increase from FY19 to FY20 due to prototype Mission System Trainer development at the Systems Integration Lab.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test and Evaluation | WR | NAWCAD : Patuxent River, MD | 6.858 | 14.079 | Dec 2017 | 35.730 | Dec 2018 | 46.390 | Nov 2019 | - | | 46.390 | Continuing | Continuing | Continuing |
| Test and Evaluation | Various | Various : Various | 0.012 | 0.013 | Jan 2018 | 3.013 | Jan 2019 | 3.013 | Jan 2020 | - | | 3.013 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 6.870 | 14.092 | | 38.743 | | 49.403 | | - | | 49.403 | Continuing | Continuing | N/A |

**Remarks**

Test and Evaluation funding increase from FY19 to FY20 supports the procurement and outfitting of support equipment associated with the integrated test facilities and additional government engineering to support contractor testing in preparation of first flight in FY21.

**Management Services ($ in Millions)**

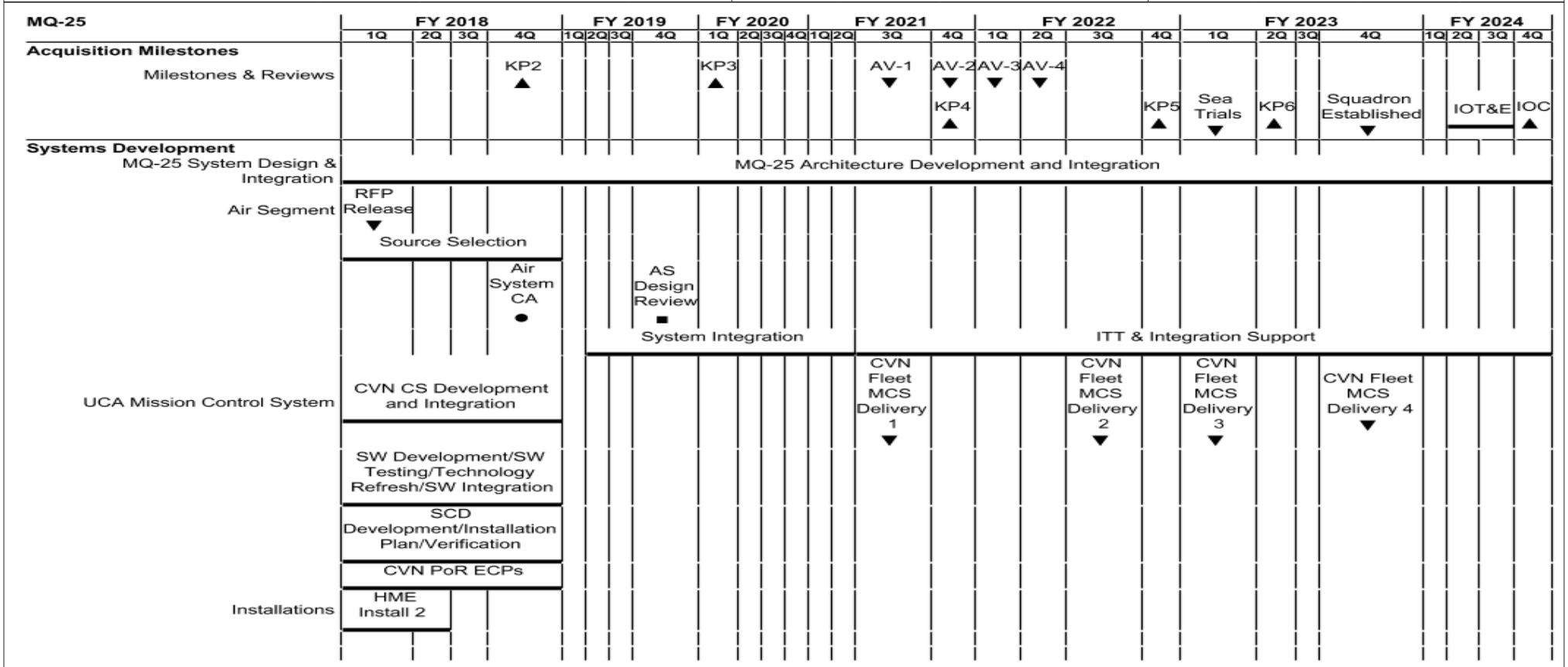
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management | Various | Various : Various | 1.100 | 1.769 | Dec 2017 | 1.804 | Dec 2018 | 1.804 | Nov 2019 | - | | 1.804 | Continuing | Continuing | Continuing |
| Management | WR | NAWCAD : Patuxent River, MD | 3.542 | 4.596 | Nov 2017 | 4.601 | Nov 2018 | 4.693 | Nov 2019 | - | | 4.693 | Continuing | Continuing | Continuing |
| Management | Various | NAVAIR : Patuxent River, MD | 0.054 | 0.130 | Oct 2017 | 0.133 | Oct 2018 | 0.133 | Oct 2019 | - | | 0.133 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 4.696 | 6.495 | | 6.538 | | 6.630 | | - | | 6.630 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | Project (Number/Name)<br>3278 / *MQ-25 Development* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 75.863 | 194.176 | | 483.915 | | 598.968 | | - | | 598.968 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |




*2020PB - 0605414N - 3278*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***MQ-25*** | | | | |
| Acquisition Milestones: Milestones & Reviews: KP2 EMD Contract Award | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Milestones & Reviews: KP3 System Design Review | 1 | 2020 | 1 | 2020 |
| Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 1 | 3 | 2021 | 3 | 2021 |
| Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 2 | 4 | 2021 | 4 | 2021 |
| Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 3 | 1 | 2022 | 1 | 2022 |
| Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 4 | 2 | 2022 | 2 | 2022 |
| Acquisition Milestones: Milestones & Reviews: KP4 First Flight | 4 | 2021 | 4 | 2021 |
| Acquisition Milestones: Milestones & Reviews: KP5 Land Trap | 4 | 2022 | 4 | 2022 |
| Acquisition Milestones: Milestones & Reviews: Initial Sea Trials | 1 | 2023 | 1 | 2023 |
| Acquisition Milestones: Milestones & Reviews: KP6 LRIP CA | 2 | 2023 | 2 | 2023 |
| Acquisition Milestones: Milestones & Reviews: Milestone Squadron Established | 4 | 2023 | 4 | 2023 |
| Acquisition Milestones: Milestones & Reviews: Inital Operational Test and Evaluation | 2 | 2024 | 3 | 2024 |
| Acquisition Milestones: Milestones & Reviews: KP7 Initial Operational Capability | 4 | 2024 | 4 | 2024 |
| Systems Development: MQ-25 System Design & Integration: MQ-25 Architecture Development and Integration | 1 | 2018 | 4 | 2024 |
| Systems Development: Air Segment: RFP Release for Air System Contract Award | 1 | 2018 | 1 | 2018 |
| Systems Development: Air Segment: Source Selection Activities | 1 | 2018 | 4 | 2018 |
| Systems Development: Air Segment: Air System Contract Award | 4 | 2018 | 4 | 2018 |
| Systems Development: Air Segment: Air System Design Review | 4 | 2019 | 4 | 2019 |
| Systems Development: Air Segment: Air System & Software Integration | 2 | 2019 | 2 | 2021 |
| Systems Development: Air Segment: ITT & Integration Support | 3 | 2021 | 4 | 2024 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3278 / *MQ-25 Development* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Systems Development: UCA Mission Control System: Carrier Vessel Nuclear (CVN) Mission Control Station (MCS) Development and Integration | 1 | 2018 | 4 | 2018 |
| Systems Development: UCA Mission Control System: CVN Fleet MCS Installation 1 | 3 | 2021 | 3 | 2021 |
| Systems Development: UCA Mission Control System: CVN Fleet MCS Installation 2 | 3 | 2022 | 3 | 2022 |
| Systems Development: UCA Mission Control System: CVN Fleet MCS Installation 3 | 1 | 2023 | 1 | 2023 |
| Systems Development: UCA Mission Control System: CVN Fleet MCS Installation 4 | 4 | 2023 | 4 | 2023 |
| Systems Development: UCA Mission Control System: Software (SW) Development/ SW Testing/Technology Refresh/SW Integration | 1 | 2018 | 4 | 2018 |
| Systems Development: UCA Mission Control System: Ship Change Document (SCD) Development/Installation Plan/Verification | 1 | 2018 | 4 | 2018 |
| Systems Development: UCA Mission Control System: CVN Program of Record (PoR) Engineering Change Proposals (ECP) | 1 | 2018 | 4 | 2018 |
| Systems Development: Installations: Hull, Mechanical & Electrical (HME) Install 2 | 1 | 2018 | 2 | 2018 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | Project (Number/Name)<br>3279 / *UMCS* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3279: *UMCS* | 0.000 | 0.000 | 35.027 | 72.290 | - | 72.290 | 58.693 | 42.662 | 29.365 | 16.683 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Unmanned Carrier Aviation (UCA) Mission Control System (UMCS) program builds, integrates, and installs control systems required to operate the MQ-25. The UMCS program includes what was previously identified as the Control System & Connectivity (CS&C) and Carrier Vessel, Nuclear (CVN) Segments previously captured under the MQ-25 Development PU 3278.

UMCS builds the following hardware: Mission Control Station (MCS), the Video Management System (VidMS), the ARC-210 Radio Communication System (RCS), and the Mobile User Objective System (MUOS) RCS (MRCS). The MCS has a ship and shore variant designated the MD-5A and MD-5B, respectively. The MD-5 consists of the following subsystems: Common Display System (CDS), Common Processing System (CPS), Network Processing Group (NPG), Integrated Communication System (ICS), and the Stingray Operating Software Suite (SOSS). MD-5A and B use the same common components with slight differences in the ICS, SOSS, and networking equipment. The VidMS provides MQ-25 operators the required video situational awareness of the unmanned carrier environment. The ARC-210 RCS provides narrow band Line of Sight (LOS) command and control (C2) transmissions with the MQ-25 while the MRCS provides narrow band Beyond Line of Sight (BLOS) C2 transmissions with the MQ-25 using the MUOS satellite system.

UMCS integrates with the MQ-25 air system, local networks, voice networks, C2 networks, tactical networks, intelligence systems, and launch and recovery systems.

UMCS performs CVN infrastructure modifications and installs the hardware mentioned above in support of MQ-25 operations aboard all NIMITZ class carriers (except CVN 68), all delivered and planned FORD class carriers, and the operational shore sites. All CVN installation and integration activities are planned and executed using the Ship Change Document (SCD) process. Installation and integration activities at the operational shore site are planned and executed via a method similar to the SCD process tailored to shore facilities.

CVN installations are regulated by Naval Sea Systems Command (NAVSEA) processes/guidelines that delineate strict schedules and deadlines for documentation, drawings, and hardware availability to support carrier modifications and by the CVN availability schedule (revised at least twice per year) which identifies pre-planned maintenance periods for all NIMITZ and FORD Class CVNs. Changes to the NAVSEA owned CVN availability schedule could, in turn, drive changes to the UMCS installation schedule.

The CVN modification and hardware installation process can be divided into four phases. Phase 1 is characterized by the development of technical data packages (TDPs), general and specific CVN hull number guidance documents, and the SCDs to be installed and begin approximately three years, or more, before the start of the CVN maintenance period. Phase 2 is characterized by the performance of a hull specific Ship Check, development of the SIDs for a specific CVN installation, and the purchase of the MD-5 subsystems, the VidMS, and the LOS/BLOS subsystems and begins two years before the start of the CVN maintenance period. Phase 3 is characterized by the approval of the SIDs, development of installation schedules, completion of cybersecurity/logistics documentation, and the integration and testing of

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3279 / *UMCS* |

the MD-5 and associated subsystems and begins approximately one year prior to the start of the CVN maintenance period. Phase 4 is characterized by the modification of the CVN infrastructure, installation of the MD-5 and associated subsystems, and completion of the system operational verification testing (SOVT) and begins as early as the beginning of the CVN maintenance period with the duration dependent the maintenance period and the number of SCDs being installed. Due to the size and complexity of UMCS modifications required to prepare the CVN, a scheduled maintenance period of at least six months is required.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Unmanned Carrier Aviation (UCA) Mission Control System | 0.000 | 35.027 | 72.290 | 0.000 | 72.290 |
| ***Articles:*** | - | - | - | - | - |

***Description:*** The UMCS program is a Government-led effort which includes, but is not limited to, development, integration, installation, and testing of the UMCS hardware and software, upgrades to existing CVN infrastructure to support accelerated delivery of MQ-25 capabilities, unique modifications to the Joint Precision Approach Landing System (JPALS) and the Aircraft Launch and Recovery Equipment (ALRE) to support specific MQ-25 capabilities, and integration with C4I systems.

***FY 2019 Plans:***
Complete the software development modification of one (1) transmit waveform for MQ-25 line of sight (LOS) communications and enable the internet protocol (IP) port for both variants of the Generation 5 (Gen 5) ARC-210 radio. Begin development to enable the IP port on the Gen 6 ARC-210 radio. Perform system integration and laboratory testing on the ARC-210 radios. Continue development of two engineering change proposals (ECPs) with Joint Precision Approach Landing System (JPALS). Complete hardware procurements, finish Ship Installation Drawings (SIDs), prepare and stage material, and begin the installation of multiple Ship Change Documents (SCDs) on two (2) CVNs. Procure the MD-5A Control Station for one (1) CVN and begin procurement of subsystems for one (1) CVN. Develop and integrate the various software components of the SOSS (Stingray Operating Software Suite) and deliver two software configurations to the MQ-25A contractor. Conduct environmental, shock, and vibration testing on the Video Management System and other Unmanned Carrier Aviation (UCA) Mission Control System (UMCS) sub-systems. Perform antenna location and frequency analysis for two (2) CVNs. Begin developing the interface requirements, drawings, and associated technical documentation required to support the creation of the Equipment and Mobile User Objective System (MUOS) SCDs in support of an FY20/21 installation. Prepare for and conduct integration testing with operationally representative communication and network systems, including C4I, to assess UMCS performance and enable CVN installation. Update all SCDs and Technical Data Packages (TDPs) based on installation redlines, technology refresh, obsolescence, and engineering changes. Conduct integration testing to assess UMCS performance with operationally representative communication and network systems. Continue development efforts on Aircraft Launch and Recovery Equipment (ALRE) systems which will interface with JPALS to

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3279 / *UMCS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| issue commands to the MQ-25A, and display status messages to the Landing Signal Officer (LSO) in order to recover the MQ-25A. These systems will be required for installation on the three (3) test ships in FY21 and FY22. Continue engineering efforts to develop and implement SCDs, SIDs, and ECPs. Continue CVN and Carrier Air Wing (CVW) integration activities and development/refinement of Concepts of Employment (CONEMPs) in accordance with NAVSEA, SPAWAR, PEO (CARRIERS), CNAF, and OPNAV processes. Continue development of Navy Modernization Program (NMP) supporting shipboard Configuration Management and Logistics. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue MQ-25 unique ARC-210 GEN 6 software modifications and complete GEN 5 radio certification. Continue developing installation guidance documentation, Ship Change Documents (SCDs), and Ship Installation Drawings (SIDs) for the four (4) test ships. Complete the installation of multiple SCDs on one CVN while continuing installation of multiple SCDs on another CVN. Complete planning, SIDs development, and material procurement to support one CVN installation. Continue designing the Mobile User Objective System (MUOS) Radio Communication System (MRCS) and begin developing the technical data package, guidance documents, and SCD for future CVN installations. Update all SCDs and technical data based on installation redlines, technology refresh, obsolescence, and engineering changes. Procure and integrate components of the MD-5 Control Station for the labs and at least two CVNs. Continue the development and integration of UMCS software components and deliver one formal configuration to the MQ-25 contractor. Develop MQ-25 unique engineering changes to the SPAWAR C4I systems. Prepare for and conduct integration testing with operationally representative communication and network systems, including C4I, to assess UMCS performance and enable CVN installation. Continue development of two engineering change proposals (ECPs) with Joint Precision Approach Landing System (JPALS). Continue developing Aircraft Launch and Recovery Equipment (ALRE) modifications to provide Situational Awareness data for MQ-25 operators aboard the CVN and to integrate with JPALS and display MQ-25 status messages to safely recover the MQ-25. Installation of the ALRE modifications will be required on the four test ships from FY20 through FY23. Continue CVN and Carrier Air Wing (CVW) integration activities and development/refinement of Concepts of Employment (CONEMPs) in accordance with NAVSEA, SPAWAR, PEO (CARRIERS), CNAF, and OPNAV processes. Continue development of Navy Modernization Program (NMP) supporting shipboard Configuration Management and Logistics. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3279 / *UMCS* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase in funding from FY19 to FY20 due to the increase in test carriers from two to four in order to provide sufficient at-sea testing to achieve the accelerated Initial Operational Capability (IOC) for the MQ-25 in FY24 and to continue development of the UMCS software, which includes two major builds and integration of software from the MQ-25 contractor. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 35.027 | 72.290 | 0.000 | 72.290 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The UMCS Program will act as a Government LSI and will modify existing systems via the affected system's Engineering Change Proposal and configuration management processes. These integration tasks include successful demonstration of integration with the CVN landing system, integration of control system, and integration with the Tasking, Collecting, Processing, Exploitation, Dissemination interfaces to include successful transmission of mission system data. The Government will develop and award contracts as required to support program activities. The Government's acquisition strategy was approved in July 2017.

**E. Performance Metrics**

Meet Navy operational requirements as defined in requirements documents.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3279 / *UMCS* |

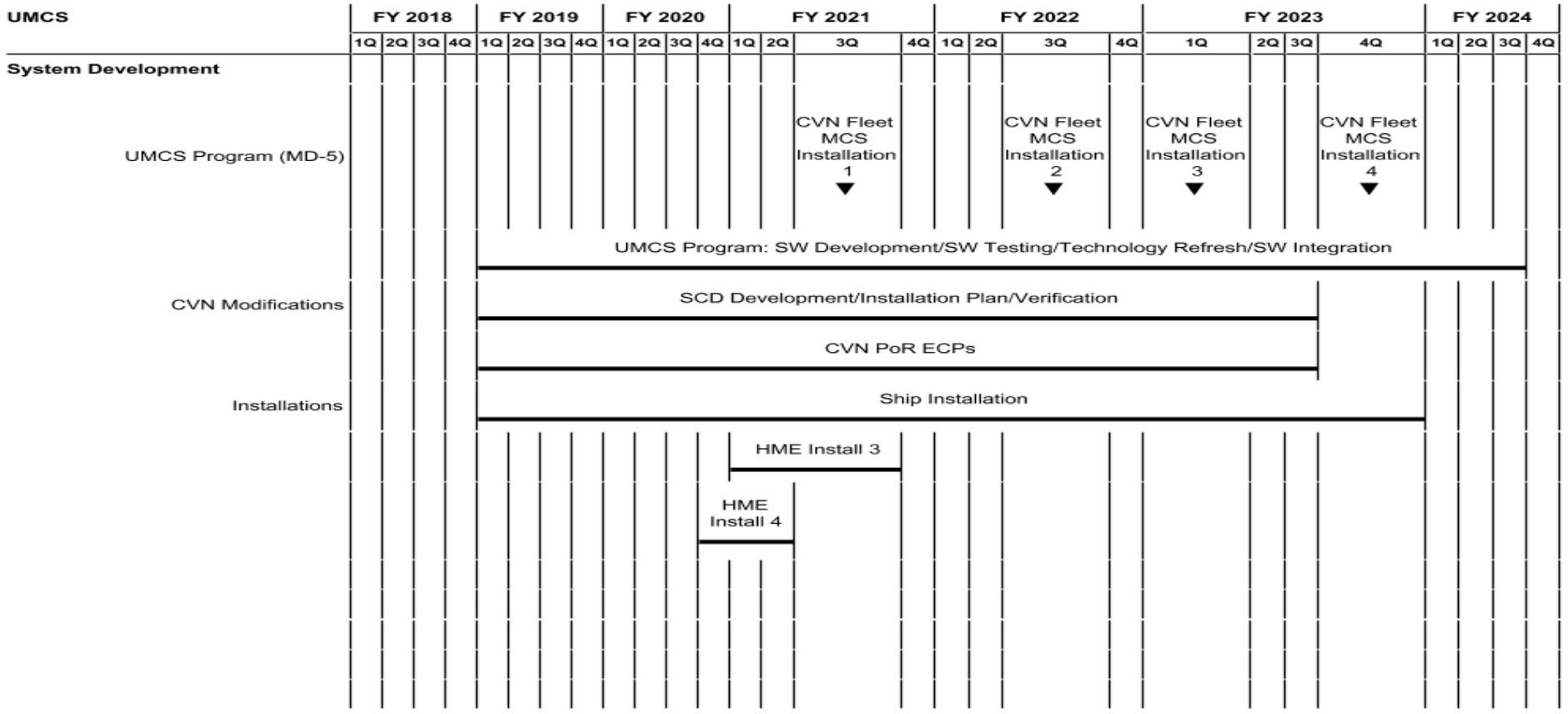
**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UMCS (Ship Integration) | Various | Various : Various | 0.000 | 0.000 | | 0.592 | Dec 2018 | 24.050 | Nov 2019 | - | | 24.050 | Continuing | Continuing | Continuing |
| UMCS (Ship Integration) | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 24.282 | Dec 2018 | 40.370 | Nov 2019 | - | | 40.370 | Continuing | Continuing | Continuing |
| UMCS (Ship Integration) | WR | NAWCAD : Lakehurst, NJ | 0.000 | 0.000 | | 4.162 | Dec 2018 | 4.990 | Nov 2019 | - | | 4.990 | Continuing | Continuing | Continuing |
| UMCS | SS/FFP | Rockwell Collins : Cedar Rapids, IA | 0.000 | 0.000 | | 3.792 | Nov 2018 | 0.820 | Nov 2019 | - | | 0.820 | 0.000 | 4.612 | 8.725 |
| UMCS | C/BA | SPAWAR : San Diego, CA | 0.000 | 0.000 | | 2.199 | Dec 2018 | 2.060 | Nov 2019 | - | | 2.060 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 35.027 | | 72.290 | | - | | 72.290 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 35.027 | | 72.290 | | - | | 72.290 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3279 / *UMCS* |




*2020PB - 0605414N - 3279 CS delivery and HM&E schedules are predicated on ship availability. CVN Fleet CS Deliveries and HM&E installations updated to better align with ship availability schedules.*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605414N / *(U) Unmanned Carrier Aviation (UCA)* | **Project (Number/Name)**<br>3279 / *UMCS* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***UMCS*** | | | | |
| System Development: UMCS Program (MD-5): CVN Fleet MCS Installation 1 | 3 | 2021 | 3 | 2021 |
| System Development: UMCS Program (MD-5): CVN Fleet MCS Installation 2 | 3 | 2022 | 3 | 2022 |
| System Development: UMCS Program (MD-5): CVN Fleet MCS Installation 3 | 1 | 2023 | 1 | 2023 |
| System Development: UMCS Program (MD-5): CVN Fleet MCS Installation 4 | 4 | 2023 | 4 | 2023 |
| System Development: UMCS Program (MD-5): UMCS Program: Software (SW) Development/SW Testing/Technology Refresh/SW Integration | 1 | 2019 | 3 | 2024 |
| System Development: CVN Modifications: Ship Change Document (SCD) Development/Installation Plan/Verification | 1 | 2019 | 3 | 2023 |
| System Development: CVN Modifications: CVN Program of Record (PoR) Engineering Change Proposals (ECP) | 1 | 2019 | 3 | 2023 |
| System Development: Installations: Ship Installation | 1 | 2019 | 4 | 2023 |
| System Development: Installations: Hull, Mechanical & Electrical (HME) Install 3 | 1 | 2021 | 3 | 2021 |
| System Development: Installations: Hull, Mechanical & Electrical (HME) Install 4 | 4 | 2020 | 2 | 2021 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605450M *I Joint Air-to-ground Missile (JAGM)* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 0.000 | 16.559 | 18.393 | - | 18.393 | 12.713 | 0.220 | 0.224 | 0.228 | Continuing | Continuing |
| 2211: *Joint Air-to-Ground Missile* | 0.000 | 0.000 | 6.759 | 18.393 | - | 18.393 | 12.713 | 0.220 | 0.224 | 0.228 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 9.800 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.800 |

**Program MDAP/MAIS Code:**
**Project MDAP/MAIS Code(s):** P355

**Note**

Prior to FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was aligned to PE 0605450N.

**A. Mission Description and Budget Item Justification**

The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that will utilize dual-mode seeker technology providing advanced line-of-sight and beyond-line-of-sight capabilities, including precision point and fire-and-forget seeker targeting and increased lethality against soft, hardened, moving, stationary, land, maritime threats. JAGM will
additionally provide robust capability in adverse weather, day or night and in obscured/countermeasure environments. The JAGM Increment 1 system will replace aviation-launched; tube-launched, optically-tracked, wire-guided (TOW), and Helicopter Launched Fire-&-Forget Missile (HELLFIRE) Systems. JAGM is an Army-led joint program that addresses
rotary wing, fixed wing, and unmanned aerial vehicle requirements. The Department of Navy threshold platform is the AH-1Z. The JAGM system includes missile, trainers, containers, support equipment and software modifications to the M-299 launcher.

The JAGM program is part of the Navy's Integrated Fire Control (IFC) approach to address advanced threat capabilities in the Anti-Access/Area-Denial (A2AD) environment. IFC solutions enable individual system capabilities to be leveraged across an effects chain, placing the full spectrum of tactical capability in the hands of the warfighter. IFC solutions that push engagement distances beyond the launch platform's radar horizon and allow the United States Navy to operate in, and control, contested battle space in littoral waters and A2/AD environments are increasingly critical as more and more scenarios require compressed and coordinated fire control timelines.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under system development and demonstration because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605450M *I Joint Air-to-ground Missile (JAGM)* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 6.759 | 0.196 | - | 0.196 |
| Current President's Budget | 0.000 | 16.559 | 18.393 | - | 18.393 |
| Total Adjustments | 0.000 | 9.800 | 18.197 | - | 18.197 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 9.800 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | 18.200 | - | 18.200 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.003 | - | -0.003 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *Marine Corps Joint Air-to-Ground Missile for Fixed Wing Aircraft* | 0.000 | 9.800 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 9.800 |
| Congressional Add Totals for all Projects | 0.000 | 9.800 |

**Change Summary Explanation**

Financial: Increase of $18.200M in FY 2020 over FY 2019 President's Budget reflects increased efforts of the JAGM program commensurate with the Milestone C approval achieved in 3rd Qtr. FY 2018.
Technical: Not applicable.
Schedule: FRP Decision changed from 4th QTR 2019 to 3rd QTR 2020
AH-1Z Integration changed from 3rd QTR 2018 to 4th QTY 2021
Development testing changed from 3rd QTR 2019 to 1st QTR 2020
Added Software Development Testing/Integration Testing: Modeling & Simulation
Added Test and Evaluation: Software Development Testing/Integration Testing: DT/IT Software Development testing
Operational Testing: OT changed from 3rd QTR 2019 to 1st QTR 2020
SIL Testing changed from 3rd QTR 2018 to 2nd QTR 2021
Contract Awards: LRIP 1 (Army Only) from 3rd to 4th QTR 2018
Contract Awards: LRIP 2 (WPN) from 3rd to 4th QTR 2018

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605450M *I Joint Air-to-ground Missile (JAGM)* |

Contract Awards: LRIP 3 (WPN) from 2nd to 4th QTR 2019
Contract Awards: FRP (WPN) from 1st to 4th QTR 2020
DT/IT Test Asset changed from 2nd to 3rd QTR 2018
Deliveries: LRIP 1 (Army Only) Changed start from 4th QTR 2018 to 1st QTR 2019
Deliveries: LRIP 2 (WPN) changed from 3rd QTR 2019 to 1st QTR 2020
Deliveries: LRIP 3 (WPN) changed from 3rd QTR 2021 to 1st QTR 2022
FRP (WPN) changed from 3rd QTR 2022 to 1st QTR 2023

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2211: *Joint Air-to-Ground Missile* | 0.000 | 0.000 | 6.759 | 18.393 | - | 18.393 | 12.713 | 0.220 | 0.224 | 0.228 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P355

**Note**

Prior to FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was aligned to PE 0605450N.

**A. Mission Description and Budget Item Justification**

The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that will utilize dual-mode seeker technology providing advanced line-of-sight and beyond-line-of-sight capabilities, including precision point and fire-and-forget seeker targeting and increased lethality against soft, hardened, moving, stationary, land, maritime threats. JAGM will
additionally provide robust capability in adverse weather, day or night and in obscured/countermeasure environments. The JAGM Increment 1 system will replace aviation-launched; tube-launched, optically-tracked, wire-guided (TOW), and Helicopter Launched Fire-&-Forget Missile (HELLFIRE) Systems. Later increments of JAGM will be fixed wing compatible.
JAGM is an Army-led joint program that addresses rotary wing, fixed wing and unmanned aerial vehicle requirements. The Department of Navy threshold platform is the AH-1Z. The JAGM system includes missile, trainers, containers, support equipment and software modifications to the M-299 launcher.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** JAGM Engineering and Manufacturing Development (EMD) Phase | 0.000 | 6.759 | 18.393 | 0.000 | 18.393 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 plans include continued execution of EMD phase and AH-1Z integration activities, including continued airworthiness certification, software development, fixed wing studies & analysis, Developmental Testing (DT), Integration Testing (IT) and Operational Testing (OT). AH-1Z software development and test efforts will continue in support of fleet software release planned for the FY 2020 Initial Operational Capability (IOC). | | | | | |
| ***FY 2020 Base Plans:***<br>FY 2020 plans include the continued execution of JAGM integration on the USMC AH-1Z platform. Efforts include software development and platform integration, continued modeling and simulation, continued software testing, and completion of required training, documentation, support equipment updates, Developmental Testing | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| (DT), and Integration Testing (IT). Additional efforts include Operational Testing (OT) in support of the Full Rate Production Decision (FRPD) and IOC on the AH-1Z.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase of $11.634M from FY 2019 to FY 2020 is due to the phasing of the integration of AH-1Z software integration, the phasing of Integration Testing, and the Operational Testing planned to occur in FY 2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 6.759 | 18.393 | 0.000 | 18.393 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E ARMY, 0605450A: *JAG* | 28.539 | 11.327 | 9.500 | - | 9.500 | 8.900 | 2.163 | 2.314 | 3.000 | Continuing | Continuing |
| • MPA, ARMY, C70302: *JAGM* | 178.432 | 276.462 | 233.353 | - | 233.353 | 213.608 | 220.900 | 213.611 | 208.833 | 0.000 | 1,671.948 |
| • WPN, NAVY, 2248: *JAGM* | 3.789 | 24.109 | 0.000 | 90.966 | 90.966 | 49.431 | 50.418 | 76.246 | 77.770 | 1,204.238 | 1,598.889 |
| • RDT&E NAVY, 0605450N: *JAGM* | 14.457 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 233.737 |

**Remarks**

**D. Acquisition Strategy**

The Joint Air-to-Ground Missile (JAGM) system is an ACAT-1C Joint Army/Navy Major Defense Acquisition Program (MDAP) with the Army designated as lead service. Milestone B was achieved in July 2015 with Milestone C achieved June 2018. The Engineering, Manufacturing and Development contract was a full and open competition and was awarded July 2015. The vendor, Lockheed Martin, is responsible for the production of a technically mature and fully producible JAGM Guidance Section (GS) as well as the integration of the GS with the current HELLFIRE-R missile warhead and motor section for Increment 1 capability. The Army is responsible for the development and production of the JAGM missile and integration on the AH-64 Apache. The Navy is responsible for integration of the JAGM on the United States Marine Corps AH-1Z with an Initial Operational Capability (IOC) in FY 2020.

**E. Performance Metrics**

Milestone C in FY 2018; IOC in FY 2020.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.901 | Nov 2018 | 1.127 | Nov 2019 | - | | 1.127 | 2.704 | 4.732 | - |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.459 | Nov 2018 | 0.744 | Nov 2019 | - | | 0.744 | 1.299 | 2.502 | - |
| Aircraft Integration (AH-1Z) | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.372 | Nov 2018 | 1.011 | Nov 2019 | - | | 1.011 | 0.524 | 1.907 | - |
| Aircraft Integration (AH-1Z) | Various | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 1.114 | Nov 2018 | 0.793 | Nov 2019 | - | | 0.793 | 5.532 | 7.439 | - |
| Integration & Test | Various | JAMS : Huntsville, AL | 0.000 | 0.000 | | 0.271 | Jan 2019 | 3.106 | Nov 2019 | - | | 3.106 | 1.716 | 5.093 | - |
| Contractor Integration & Test | C/FFP | Lockheed Martin : Orlando, FL | 0.000 | 0.000 | | 0.000 | | 0.845 | Jan 2020 | - | | 0.845 | 0.000 | 0.845 | 0.845 |
| Studies and Analysis | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.200 | 0.200 | - |
| Prior year cost Prod Dev no | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 3.117 | | 7.626 | | - | | 7.626 | 11.975 | 22.718 | N/A |

**Remarks**

Funding for FY 2018 is reflected in PE 0605450N.

Systems Engineering, Aircraft Integration, and Contractor Integration & Test lines increase in FY 2020 to support the AH-1Z software integration schedule and required testing support to the program IOC.

Integration & Test - Funding in this line includes integration & test support, modeling & simulation and telemetry kits.
Contractor Integration & Test - Funding supports execution of Platform Integration and DT/IT Testing

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.163 | Nov 2018 | 0.356 | Nov 2019 | - | | 0.356 | 0.278 | 0.797 | - |
| Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.076 | Nov 2018 | 0.455 | Nov 2019 | - | | 0.455 | 0.153 | 0.684 | - |
| Prior year Support cost no | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | Nov 2019 | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.239 | | 0.811 | | - | | 0.811 | 0.431 | 1.481 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | Various | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.341 | Nov 2018 | 5.467 | Nov 2019 | - | | 5.467 | 1.958 | 7.766 | - |
| Test & Evaluation | Various | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.456 | Nov 2019 | - | | 0.456 | 0.127 | 0.583 | - |
| Test & Evaluation | Various | USMC : MCAS Yuma, AZ | 0.000 | 0.000 | | 1.638 | Mar 2019 | 2.613 | Nov 2019 | - | | 2.613 | 0.375 | 4.626 | - |
| Test & Evaluation | Various | Various : Various | 0.000 | 0.000 | | 0.132 | Nov 2018 | 0.276 | Nov 2019 | - | | 0.276 | 0.000 | 0.408 | - |
| Prior year T&E cost no | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 2.111 | | 8.812 | | - | | 8.812 | 2.460 | 13.383 | N/A |

**Remarks**

Test & Evaluation increase in FY 2020 to reflect the planned Integration Testing (IT) and Operational Testing (OT) events in support of the program IOC.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contr Eng Supt - ETS (NONFFRDC) | Various | Various : Various | 0.000 | 0.000 | | 0.936 | Feb 2019 | 0.683 | Feb 2020 | - | | 0.683 | 0.808 | 2.427 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |

**Management Services ($ in Millions)**

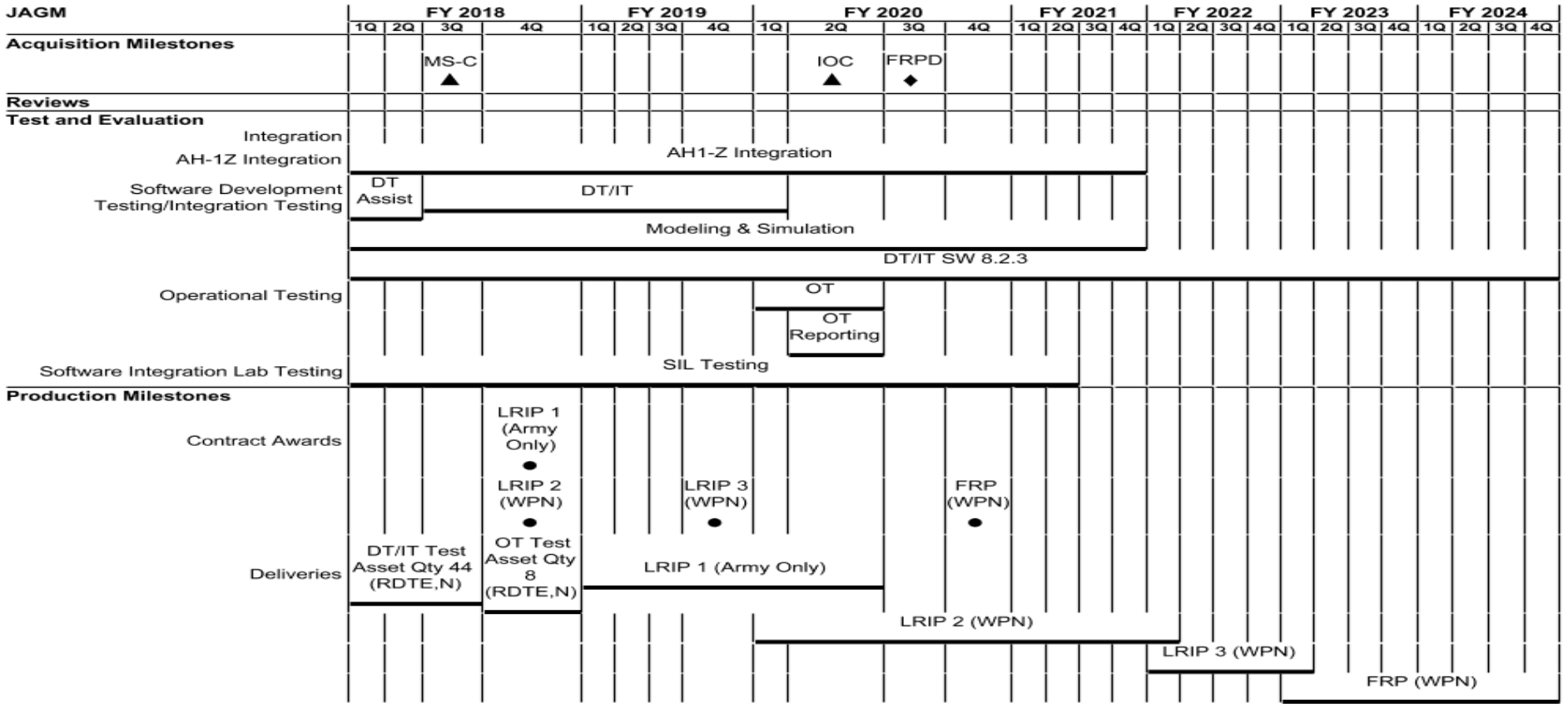
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Services | Various | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.296 | Nov 2018 | 0.383 | Nov 2019 | - | | 0.383 | 0.592 | 1.271 | - |
| Travel | Various | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.060 | Oct 2018 | 0.078 | Oct 2019 | - | | 0.078 | Continuing | Continuing | Continuing |
| Prior year Mngt Svcs cost no | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 1.292 | | 1.144 | | - | | 1.144 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 6.759 | | 18.393 | | - | | 18.393 | Continuing | Continuing | N/A |

**Remarks**

1) Program acquisition milestones (minus unique Initial Operating Capability) and production milestones are joint program milestones for both Army and Navy.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |




*2020PB - 0605450M - 2211*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JAGM*** | | | | |
| Acquisition Milestones: Milestone C | 3 | 2018 | 3 | 2018 |
| Acquisition Milestones: IOC | 2 | 2020 | 2 | 2020 |
| Acquisition Milestones: FRP Decision | 3 | 2020 | 3 | 2020 |
| Test and Evaluation: AH-1Z Integration: AH-1Z Integration | 1 | 2018 | 4 | 2021 |
| Test and Evaluation: Software Development Testing/Integration Testing: DT Assist | 1 | 2018 | 2 | 2018 |
| Test and Evaluation: Software Development Testing/Integration Testing: DT/IT Software 8.2.2 Development testing | 3 | 2018 | 1 | 2020 |
| Test and Evaluation: Software Development Testing/Integration Testing: Modeling & Simulation | 1 | 2018 | 4 | 2021 |
| Test and Evaluation: Software Development Testing/Integration Testing: DT/IT Software Development testing 8.2.3 | 1 | 2018 | 4 | 2024 |
| Test and Evaluation: Operational Testing: OT | 1 | 2020 | 2 | 2020 |
| Test and Evaluation: Operational Testing: OT Reporting | 2 | 2020 | 2 | 2020 |
| Test and Evaluation: Software Integration Lab Testing: SIL Testing | 1 | 2018 | 2 | 2021 |
| Production Milestones: Contract Awards: LRIP 1 (Army Only) | 4 | 2018 | 4 | 2018 |
| Production Milestones: Contract Awards: LRIP 2 (WPN) | 4 | 2018 | 4 | 2018 |
| Production Milestones: Contract Awards: LRIP 3 (WPN) | 4 | 2019 | 4 | 2019 |
| Production Milestones: Contract Awards: FRP (WPN) | 4 | 2020 | 4 | 2020 |
| Production Milestones: Deliveries: DT/IT Test Asset | 1 | 2018 | 3 | 2018 |
| Production Milestones: Deliveries: OT Test Asset | 4 | 2018 | 4 | 2018 |
| Production Milestones: Deliveries: LRIP 1 (Army Only) | 1 | 2019 | 2 | 2020 |
| Production Milestones: Deliveries: LRIP 2 (WPN) | 1 | 2020 | 1 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Production Milestones: Deliveries: LRIP 3 (WPN) | 1 | 2022 | 1 | 2023 |
| Production Milestones: Deliveries: FRP (WPN) | 1 | 2023 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 9.800 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 9.800 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Joint Air to Ground Missile Fixed Wing (JAGM-F) is being developed as a modification to the rotary wing JAGM variant, and includes modifications necessary to be compatible with DoN and USAF fixed wing aircraft. The Department of the Navy (DoN) and United States Air Force (USAF) integration and test activities will inform the DoNs acquisition approach for JAGM as a potential successor to the aging MAVERICK program. The JAGM dual-mode seeker capabilities are common with the rotary wing JAGM variant and provide similar capabilities. DoN platforms of interest include AV-8B, F/A-18C/D, F/A-18 E/F/G, and Joint Strike Fighter (JSF).

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** Marine Corps Joint Air-to-Ground Missile for Fixed Wing Aircraft | 0.000 | 9.800 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** JAGM F activities will include initial design trades and changes and associated integration activities required to utilize the rotary wing JAGM on fixed wing platforms. Efforts will include incorporation of mechanical and electrical design changes to the weapon required to support employment on fixed wing aircraft and launchers, procurement of initial test hardware, preliminary airworthiness analysis and associated activities, and initial testing activities on DoN Aircraft. | | |
| **Congressional Adds Subtotals** | 0.000 | 9.800 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

JAGM-F development, design, and platform integration efforts in FY 2019.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hardware Development/Software | TBD | Lockheed Martin : Orlando, Fla | 0.000 | 0.000 | | 7.300 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 7.300 | - |
| Hardware Development | TBD | CoAspire : Fairfax, Va | 0.000 | 0.000 | | 0.250 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| System Engineering | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.534 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.534 | - |
| System Engineering | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.751 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.751 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 8.835 | | 0.000 | | - | | 0.000 | 0.000 | 8.835 | N/A |

**Remarks**

Systems Engineering, software development, and fixed wing analysis in support of the Department of the Navy's fixed wing aircraft to include AV-8B, F/A-18 C/D, F/A-18 E/F/G, and JSF-B. Hardware procurements will include Instrumented Measurement Vehicles (IMV) and JAGM-F assets to support airworthiness and early developmental testing.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Testing Support | WR | JAMS : Huntsville, AL | 0.000 | 0.000 | | 0.250 | Aug 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.250 | | 0.000 | | - | | 0.000 | 0.000 | 0.250 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | NAWCWD : China Lake, CA | 0.000 | 0.000 | | 0.270 | Aug 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.270 | - |
| Software Testing | WR | NAWCAD : Patuxent River, MD | 0.000 | 0.000 | | 0.250 | Aug 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.250 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.520 | | 0.000 | | - | | 0.000 | 0.000 | 0.520 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

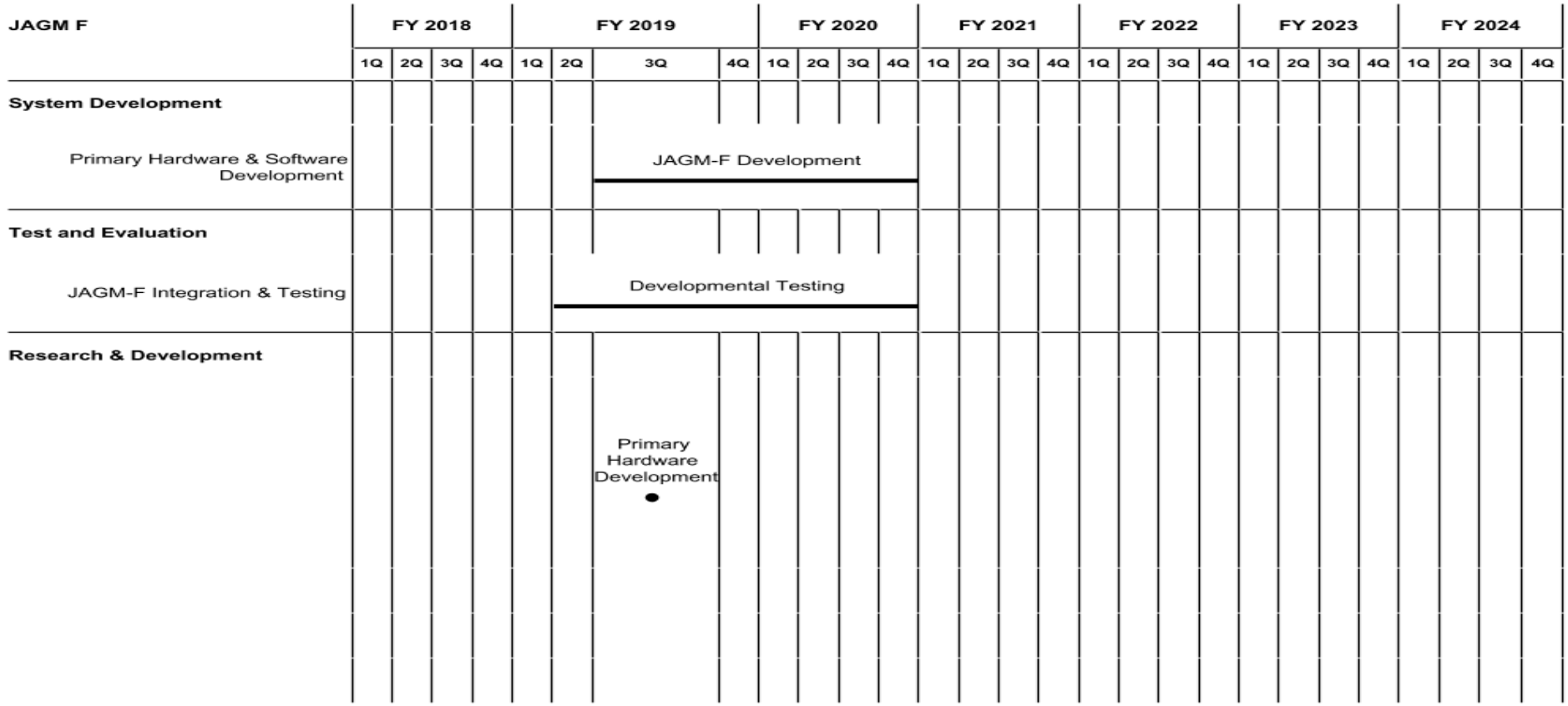
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Services | Various | NAWCAD : Patuxent River, Md | 0.000 | 0.000 | | 0.150 | Apr 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.150 | - |
| Travel | Various | Various : Various | 0.000 | 0.000 | | 0.045 | Mar 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.045 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.195 | | 0.000 | | - | | 0.000 | 0.000 | 0.195 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 9.800 | | 0.000 | | - | | 0.000 | 0.000 | 9.800 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0605450M - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450M / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JAGM F*** | | | | |
| System Development: Primary Hardware & Software Development: Contract Award | 3 | 2019 | 4 | 2020 |
| Test and Evaluation: JAGM-F Integration & Testing: JAGM-F Integration & Testing | 2 | 2019 | 4 | 2020 |
| Research & Development: Primary Hardware Development | 3 | 2019 | 3 | 2019 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605450N *I Joint Air-to-ground Missile (JAGM)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 219.280 | 14.457 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 233.737 |
| 2211: *Joint Air-to-Ground Missile* | 219.280 | 14.457 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 233.737 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** P355 | | | | | | | | | | | | |

**Note**

Starting in FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was realigned to PE 0605450M.

**A. Mission Description and Budget Item Justification**

The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that will utilize dual-mode seeker technology providing advanced line-of-sight and beyond-line-of-sight capabilities, including precision point and fire-and-forget seeker targeting and increased lethality against soft, hardened, moving, stationary, land, maritime threats. JAGM will additionally provide robust capability in adverse weather, day or night and in obscured/countermeasure environments. The JAGM Increment 1 system will replace aviation-launched; tube-launched, optically-tracked, wire-guided (TOW), and Helicopter Launched Fire-&-Forget Missile (HELLFIRE) Systems. JAGM is an Army-led joint program that addresses rotary wing, fixed wing, and unmanned aerial vehicle requirements. The Department of Navy threshold platform is the AH-1Z. The JAGM system includes missile, trainers, containers, support equipment and software modifications to the M-299 launcher.

The JAGM program is part of the Navy's Integrated Fire Control (IFC) approach to address advanced threat capabilities in the Anti-Access/Area-Denial (A2AD) environment. IFC solutions enable individual system capabilities to be leveraged across an effects chain, placing the full spectrum of tactical capability in the hands of the warfighter. IFC solutions that push engagement distances beyond the launch platform's radar horizon and allow the United States Navy to operate in, and control, contested battle space in littoral waters and A2/AD environments are increasingly critical as more and more scenarios require compressed and coordinated fire control timelines.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under system development and demonstration because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | Date: March 2019 |
|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | R-1 Program Element (Number/Name)<br>PE 0605450N *I Joint Air-to-ground Missile (JAGM)* | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
| Previous President's Budget | 15.473 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 14.457 | 0.000 | 0.000 | - | 0.000 |
| Total Adjustments | -1.016 | 0.000 | 0.000 | - | 0.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.416 | 0.000 | | | |
| • Congressional Directed Reductions Adjustments | -0.600 | - | - | - | - |

**Change Summary Explanation**

Starting in FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was realigned to PE 0605450M.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | | | | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2211: *Joint Air-to-Ground Missile* | 219.280 | 14.457 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 233.737 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P355

**Note**

Starting in FY 2019, funding for Joint Air-to-Ground Missile (JAGM) was realigned to PE 0605450M.

**A. Mission Description and Budget Item Justification**

The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that will utilize dual-mode seeker technology providing advanced line-of-sight and beyond-line-of-sight capabilities, including precision point and fire-and-forget seeker targeting and increased lethality against soft, hardened, moving, stationary, land, maritime threats. JAGM will additionally provide robust capability in adverse weather, day or night and in obscured/countermeasure environments. The JAGM Increment 1 system will replace aviation-launched; tube-launched, optically-tracked, wire-guided (TOW), and Helicopter Launched Fire-&-Forget Missile (HELLFIRE) Systems. Later increments of JAGM will be fixed wing compatible. JAGM is an Army-led joint program that addresses rotary wing, fixed wing and unmanned aerial vehicle requirements. The Department of Navy threshold platform is the AH-1Z. The JAGM system includes missile, trainers, containers, support equipment and software modifications to the M-299 launcher.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** JAGM Engineering and Manufacturing Development (EMD) Phase | 14.457 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A | | | | | |
| ***FY 2020 Base Plans:***<br>N/A | | | | | |
| ***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 14.457 | 0.000 | 0.000 | 0.000 | 0.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDT&E ARMY, 0605450A: *JAGM* | 28.539 | 11.773 | 9.500 | - | 9.500 | 8.900 | 2.163 | 2.314 | 3.000 | Continuing | Continuing |
| • MPA, ARMY, C70302: *JAGM* | 178.432 | 276.462 | 233.353 | - | 233.353 | 213.608 | 220.900 | 213.611 | 208.833 | 0.000 | 1,671.948 |
| • WPN, NAVY, 2248: *JAGM* | 3.789 | 24.109 | 0.000 | 90.966 | 90.966 | 49.431 | 50.418 | 76.246 | 77.770 | 1,204.238 | 1,598.889 |
| • RDT&E NAVY, 0605450M: *JAGM* | 0.000 | 6.759 | 18.393 | - | 18.393 | 12.713 | 0.220 | 0.224 | 0.228 | 0.000 | 38.537 |

**Remarks**

**D. Acquisition Strategy**

The Joint Air-to-Ground Missile (JAGM) system is an ACAT-1C Joint Army/Navy Major Defense Acquisition Program (MDAP) with the Army designated as lead service. Milestone B was achieved in July 2015 with Milestone C achieved June 2018. The Engineering, Manufacturing and Development contract was a full and open competition and was awarded July 2015. The vendor, Lockheed Martin, is responsible for the production of a technically mature and fully producible JAGM Guidance Section (GS) as well as the integration of the GS with the current HELLFIRE-R missile warhead and motor section for Increment 1 capability. The Army is responsible for the development and production of the JAGM missile and integration on the AH-64 Apache. The Navy is responsible for integration of the JAGM on the United States Marine Corps AH-1Z with an Initial Operational Capability (IOC) in FY 2020.

**E. Performance Metrics**

Milestone C in FY 2018; IOC in FY 2020

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | WR | NAWCWD : China Lake, CA | 52.876 | 1.014 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 53.890 | - |
| Systems Engineering | WR | NAWCAD : Patuxent River, MD | 2.139 | 0.459 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 2.598 | - |
| Aircraft Integration | WR | NAWCAD : Patuxent River, MD | 10.337 | 0.563 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.900 | - |
| Aircraft Integration (AH-1Z) | Various | NAWCWD : China Lake, CA | 6.818 | 2.040 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.858 | - |
| Contractor Aircraft Integration (AH-1Z) | Various | Northrup Grumman : Woodlawn Hills, CA | 14.030 | 3.436 | Sep 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.466 | - |
| Integration & Test | Various | JAMS : Huntsville, AL | 29.510 | 1.576 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 31.086 | - |
| Prior year cost Prod Dev no longer funded in the FYDP | Various | Various : Various | 24.503 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 24.503 | - |
| | | **Subtotal** | 140.213 | 9.088 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 149.301 | N/A |

**Remarks**

Contractor Aircraft Integration (AH-1Z) - Funding in this line includes software support associated with the integration of JAGM on the AH-1Z.
Integration & Test - Funding in this line includes integration & test support, modeling & simulation and telemetry kits.
Contractor Integration & Test - Funding in this line includes hardware and support associated with the Engineering and Manufacturing Development (EMD) contract.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | NAWCWD : China Lake, CA | 1.131 | 0.163 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.294 | - |
| Integrated Logistics Support | WR | NAWCAD : Patuxent River, MD | 0.155 | 0.076 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.231 | - |
| Prior year Support cost no longer funded in the FYDP | Various | Various : Various | 12.447 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 12.447 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 13.733 | 0.239 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 13.972 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation | Various | NAWCAD : Patuxent River, MD | 4.541 | 0.451 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.992 | - |
| Test & Evaluation | Various | NAWCWD : China Lake, CA | 0.000 | 1.627 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.627 | - |
| Test & Evaluation | Various | USMC : MCAS Yuma, AZ | 0.000 | 1.121 | Mar 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.121 | - |
| Test & Evaluation | Various | Various : Various | 0.210 | 0.639 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.849 | - |
| Prior year T&E cost no longer funded in the FYDP | Various | Various : Various | 41.328 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 41.328 | - |
| | | **Subtotal** | 46.079 | 3.838 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 49.917 | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contr Eng Supt - ETS (NONFFRDC) | Various | Various : Various | 3.486 | 0.936 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.422 | - |
| Management Services | Various | NAWCAD : Patuxent River, MD | 15.173 | 0.296 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.469 | - |
| Travel | Various | NAWCAD : Patuxent River, MD | 0.596 | 0.060 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.656 | - |
| Prior year Mngt Svcs cost no longer funded in the FYDP | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| | | **Subtotal** | 19.255 | 1.292 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.547 | N/A |

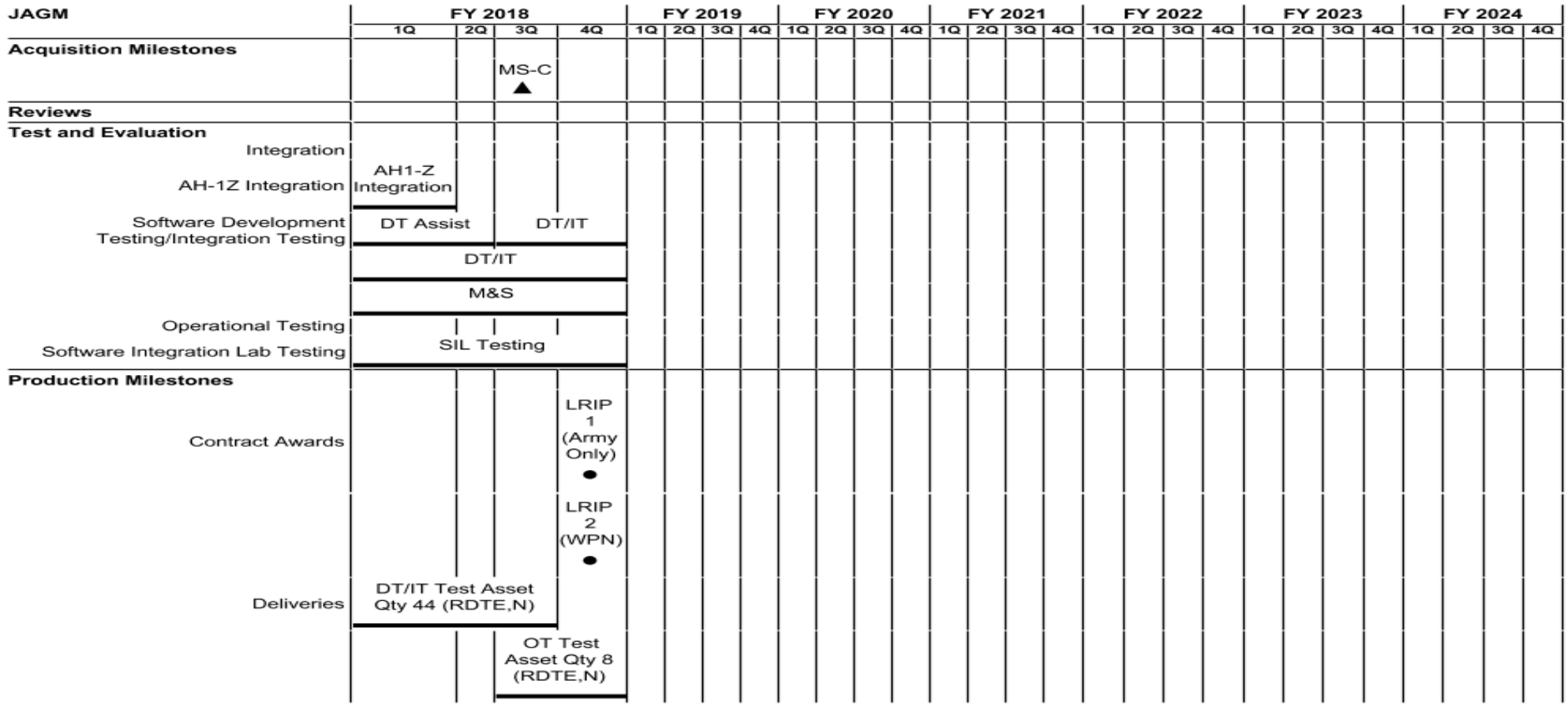
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | Project (Number/Name)<br>2211 / *Joint Air-to-Ground Missile* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 219.280 | 14.457 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 233.737 | N/A |

**Remarks**

1) Program acquisition milestones (minus unique Initial Operating Capability) and production milestones are joint program milestones for both Army and Navy.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |




*2020DON - 0605450N - 2211*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605450N / *Joint Air-to-ground Missile (JAGM)* | **Project (Number/Name)**<br>2211 / *Joint Air-to-Ground Missile* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***JAGM*** | | | | |
| Acquisition Milestones: Milestone C | 3 | 2018 | 3 | 2018 |
| Test and Evaluation: AH-1Z Integration: AH-1Z Integration | 1 | 2018 | 1 | 2018 |
| Test and Evaluation: Software Development Testing/Integration Testing: DT Assist | 1 | 2018 | 2 | 2018 |
| Test and Evaluation: Software Development Testing/Integration Testing: DT/IT Software 8.2.2 Development testing | 3 | 2018 | 4 | 2018 |
| Test and Evaluation: Software Development Testing/Integration Testing: DT/IT Software 8.2.3 Development testing | 1 | 2018 | 4 | 2018 |
| Test and Evaluation: Software Development Testing/Integration Testing: Modeling & Simulation | 1 | 2018 | 4 | 2018 |
| Test and Evaluation: Software Integration Lab Testing: SIL Testing | 1 | 2018 | 4 | 2018 |
| Production Milestones: Contract Awards: LRIP 1 (Army Only) | 4 | 2018 | 4 | 2018 |
| Production Milestones: Contract Awards: LRIP 2 (WPN) | 4 | 2018 | 4 | 2018 |
| Production Milestones: Deliveries: DT/IT Test Asset | 1 | 2018 | 3 | 2018 |
| Production Milestones: Deliveries: OT Test Asset | 3 | 2018 | 4 | 2018 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605500N *I Multi-mssn Maritime Aircraft (MMA) (P-8A)* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 7,914.080 | 11.422 | 34.196 | 21.472 | - | 21.472 | 10.310 | 10.523 | 10.696 | 10.909 | Continuing | Continuing |
| 2696: *Multi-Mission Maritime Aircraft* | 7,910.593 | 8.695 | 7.466 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 7,926.754 |
| 3368: *P-8 Improvements* | 3.487 | 2.727 | 26.730 | 21.472 | - | 21.472 | 10.310 | 10.523 | 10.696 | 10.909 | Continuing | Continuing |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 334 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The P-8A Multi-mission Maritime Aircraft (MMA) will replace the aging P-3 aircraft. The P-8A program was initiated in response to the Joint Requirements Oversight Council (JROC) validated Mission Needs Statement, "Broad Area Maritime and Littoral Armed Intelligence, Surveillance and Reconnaissance" and the requirements for the program are defined in the P-8A Capability Production Document #791-88-09, validated and approved on 22 June 2009. A successful Critical Design Review was completed in June 2007. In August 2007 the Design Readiness Review was conducted and resulted in approval to obligate funding for the fabrication of the Stage II flight test aircraft. The first flight of P-8A occurred on 25 Apr 2009. Milestone C was successfully completed on 11 August 2010. The program completed Initial Operational Test and Evaluation (IOT&E) in March 2013 and achieved Initial Operational Capability (IOC) in November 2013. The Acquisition Decision Memorandum approved entry into Full Rate Production on January 3, 2014.

The primary objectives of Systems Development and Demonstration (SDD) are to perform the system detailed design, develop and produce Systems Integration Labs, develop and build ground and flight test articles, and conduct ground and flight tests to successfully achieve program milestones. Ground testing includes the conduct of static testing, fatigue testing and Live Fire Test and Evaluation. Six flight test aircraft have been built during SDD (PU 2696). These test aircraft are grouped into two stages based on which phase of the test program the aircraft will support. SDD Stage I flight test aircraft (FY06/Qty-3) support Integrated Test and Evaluation (IT&E). SDD Stage II flight test aircraft (FY09/Qty-3) supported the completion of IT&E and IOT&E after being updated to the production configuration. The SDD contract includes the development and initial building of training devices to support IOT&E. The scope of SDD includes activities necessary to facilitate an efficient transition of the fleet to achieve the P-8A IOC of SDD (PU 2696) in CY13. The scope of SDD also includes the engineering and verification of corrected deficiencies identified in testing and Fleet operational use. P-8A entered Production and Deployment phase in the 4th quarter of FY10 and entered Full Rate Production in 2nd quarter of FY14.

P-8A program is based on an evolutionary acquisition strategy consisting of sequential incremental enhancements to system capabilities that will retain cost-wise effectiveness for winning major combat operations. In order to pace the threat, Spiral One (Increment 2), the Next Phase of Capabilities, will incorporate the following capabilities into the P-8A: Multi-Static Active Coherent (MAC), Automatic Identification System, Rapid Capabilities Insertion (RCI), updates to the Tactical Operations Center (TOC), as well as additional Anti-Submarine Warfare (ASW), Anti-Surface Warfare and Intelligence Surveillance and Reconnaissance capabilities as Engineering Change Proposals (ECPs). The scope of this effort includes the integration, design, ground testing (lab & aircraft) and flight test of the capability enhancements to the P-8A and associated Tactical Operations Center ground support facilities and initial trainers. Integration and test of these capabilities as well as integration of Advanced

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605500N *I Multi-mssn Maritime Aircraft (MMA) (P-8A)* |

Airborne Sensor capability will be accomplished incrementally, based on the scope of the integration effort. This includes support of Special Mission Configuration Test Program.

The P-8A MMA program also includes a sequence of RCI's and rapid development efforts to respond to evolving threats which will retain cost-wise effectiveness for winning major combat operations. In order to pace the threat, these efforts will incorporate incremental software and hardware improvements to existing sensors, communications systems, mission systems, weapons capabilities and TOC to build on the P-8A capability baseline. These capabilities, and other emergent capability requirements, will be prioritized through the Navy Integration and Interoperability (I&I)-aligned Capability Prioritization Process (CPP) and P-8A Tier 3 Capability Roadmap. The CPP process will be supported by detailed analysis and the maturation of developing technologies.

RCI 4 capabilities include Tactical Swap Application; Theatre ASW Application; PMA 264 Advanced Product Build (APB) which consists of MAC Continuous Active Sonar/Continuous CW transmission (CAS/CCW), SSQ-62 DICASS Auto Dect and MAC Adaptive Beamforming; Combat System Optimization and Digital Wideband Receiver (DWR).

Rapid Development efforts include Airborne Weapons Simulator and ASW Sonobuoy receiver digitization for SSQ-125A.

Budget Activity 5.
JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 11.795 | 37.296 | 10.184 | - | 10.184 |
| Current President's Budget | 11.422 | 34.196 | 21.472 | - | 21.472 |
| Total Adjustments | -0.373 | -3.100 | 11.288 | - | 11.288 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -3.100 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | 0.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.373 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 11.300 | - | 11.300 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.012 | - | -0.012 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605500N *I Multi-mssn Maritime Aircraft (MMA) (P-8A)* |

**Change Summary Explanation**

The FY 2020 funding request was increased by $11.300M to support the final phase of Airborne Weapons Simulator development. This is a critical enabler for crew weapons currency and proficiency for all P-8A weapons and will contribute to decreasing future weapons procurement training costs.

Technical: Not applicable.

Schedule: Not applicable.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | Project (Number/Name)<br>2696 / *Multi-Mission Maritime Aircraft* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2696: *Multi-Mission Maritime Aircraft* | 7,910.593 | 8.695 | 7.466 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 7,926.754 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 334

**A. Mission Description and Budget Item Justification**

The P-8A Multi-mission Maritime Aircraft (MMA) will replace the aging P-3 aircraft. The P-8A program was initiated in response to the Joint Requirements Oversight Council validated Mission Needs Statement, "Broad Area Maritime and Littoral Armed Intelligence, Surveillance and Reconnaissance" and the requirements for the program are defined in the P-8A Capability Production Document (CPD) #791-88-09, validated and approved on 22 June 2009. A successful Critical Design Review was completed in June 2007. In August 2007 the Design Readiness Review was conducted and resulted in approval to obligate funding for the fabrication of the Stage II flight test aircraft. The first flight of P-8A occurred on 25 Apr 2009. Milestone C was successfully completed on 11 August 2010. The program completed Initial Operational Test and Evaluation (IOT&E) in March 2013 and achieved Initial Operational Capability (IOC) in November 2013. The Acquisition Decision Memorandum approved entry into Full Rate Production on January 3, 2014.

The primary objectives of Systems Development and Demonstration (SDD) are to perform the system detailed design, develop and produce Systems Integration Labs, develop and build ground and flight test articles, and conduct ground and flight tests to successfully achieve program milestones. Ground testing includes the conduct of static testing, fatigue testing and Live Fire Test and Evaluation. Six flight test aircraft have been built during SDD. These test aircraft are grouped into two stages based on which phase of the test program the aircraft will support. SDD Stage I flight test aircraft (FY06/Qty-3) support Integrated Test and Evaluation (IT&E). SDD Stage II flight test aircraft (FY09/Qty-3) supported the completion of IT&E and IOT&E after being updated to the production configuration. The SDD contract includes the development and initial building of training devices to support IOT&E. The scope of SDD includes activities necessary to facilitate an efficient transition of the fleet to achieve the P-8A IOC of SDD (PU 2696) in CY13. The scope of SDD also includes the engineering and verification of corrected deficiencies identified in testing and Fleet operational use and the baseline air to air refueling. P-8A entered Production and Deployment phase in the 4th quarter of FY10 and entered Full Rate Production in 2nd quarter of FY14.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Continue System Development & Demonstration | 8.110 | 7.096 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>SDD phase. Scope of effort includes: support and update to ground and flight test articles (Stage I and II), and completion of Third Lifetime Full-Scale Fatigue Test analysis. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>2696 / *Multi-Mission Maritime Aircraft* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Not applicable.<br>***FY 2020 OCO Plans:***<br>Not applicable.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No funds are allocated to the program in FY20. | | | | | |
| ***Title:*** Continue Engineering and Technical Development and Test for Sys Dev & Demonstration contracts | 0.585 | 0.370 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue analysis of contracted deliverables; direct technical and logistic support of system development test aircraft; conduct fatigue analysis and delivery of reports; evaluate contract cost, schedule, and performance; test preparations, provide necessary government furnished equipment and test articles, risk assessment/mitigation; program control; and performance status. Conduct and support FOT&E/VCD.<br>***FY 2020 Base Plans:***<br>Not applicable.<br>***FY 2020 OCO Plans:***<br>Not applicable.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>No funds are allocated to the program in FY20. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 8.695 | 7.466 | 0.000 | 0.000 | 0.000 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN1/0193: *P-8A MMA* | 1,709.642 | 1,761.753 | 1,206.701 | - | 1,206.701 | 80.325 | 0.000 | 0.000 | 0.000 | 0.000 | 22,011.962 |
| • APN6/0605: *P-8A Initial Spares* | 101.188 | 37.428 | 3.152 | - | 3.152 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 141.768 |

**Remarks**

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>2696 / *Multi-Mission Maritime Aircraft* |

**D. Acquisition Strategy**

The MMA Milestone 0 was approved 22 March 2000 and the resulting Acquisition Decision Memorandum directed P-8A to begin the Concept Exploration phase consisting of an Analysis of Alternatives and industry concept studies. These activities began 3Q/01 and were funded under Program Element 0702207N Project Unit W2737. Approval to enter Component Advance Development (CAD) was attained from the Overarching Integrated Product Team on 18 Jan 2002 and the Milestone Decision Authority Under Secretary of Defense for Acquisition, Technology, & Logistics approved the program Acquisition Strategy on 8 Feb 2002. The CAD was a competitive award to multiple contractors to define alternative MMA concept system architectures and evaluate associated risks and proposed mitigations. Selection of MMA concept and approval to enter SDD phase occurred at MS B decision review on 28 May 2004. The contract was awarded to Boeing on 14 June 2004. The SDD phase is being used to design, develop and test the P-8A system. The P-8A program was initiated in response to the Joint Requirements Oversight Council validated Mission Needs Statement, "Broad Area Maritime and Littoral Armed Intelligence, Surveillance and Reconnaissance" and the requirements for the program are defined in the Capability Production Document. MS C was successfully completed on 11 August 2010 approving entry into the Production and Deployment Phase. P-8A Initial Operational Capability achieved in November 2013. Entry into Full Rate Production was approved on 3 January 2014.

**E. Performance Metrics**

Completed first period of Follow-On Test & Evaluation (FOT&E) and Verification of Corrected Deficiencies (VCD) in 2nd quarter 2014. Completed second and third FOT&E and VCD Feb 2015 and Dec 2015. Completed Air to Air Refueling (AAR) ground and developmental flight testing, H-Stab fatigue and residual strength testing, and Second Lifetime Full- Scale Fatigue Test cycling in FY16. H-Stab static and AAR operational test completed in FY17. Completion of FY18 & FY19 FOT&E and VCD. Completion of Fatigue Testing analysis.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | Project (Number/Name)<br>2696 / *Multi-Mission Maritime Aircraft* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Dev - Boeing | C/CPAF | Boeing : Seattle, WA | 6,993.972 | 7.451 | Dec 2017 | 6.946 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 7,008.369 | 7,008.369 |
| Sys Eng (gov) | WR | NAWC AD : Pax River, MD | 85.157 | 0.659 | Nov 2017 | 0.150 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 85.966 | - |
| Prior year Prod Dev cost no longer funded in the FYDP | Various | Various : Various | 319.530 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 319.530 | - |
| | | **Subtotal** | 7,398.659 | 8.110 | | 7.096 | | 0.000 | | - | | 0.000 | 0.000 | 7,413.865 | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Int. Log Gov | WR | NAWC AD : Pax River, MD | 43.918 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 43.918 | - |
| Tech Dev Gov | WR | NAWC AD : Pax River, MD | 77.766 | 0.162 | Nov 2017 | 0.160 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 78.088 | - |
| Prior year Support cost no longer funded in the FYDP | Various | Various : Various | 31.369 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 31.369 | - |
| | | **Subtotal** | 153.053 | 0.162 | | 0.160 | | 0.000 | | - | | 0.000 | 0.000 | 153.375 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dev T&E - Gov | WR | NAWC AD : Pax River, MD | 100.210 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 100.210 | - |
| GFE & GFI | WR | NAWC AD : Pax River, MD | 89.688 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 89.688 | - |
| Oper Test & Eval | WR | NAWC AD : Pax River, MD | 6.642 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.642 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | Project (Number/Name)<br>2696 / *Multi-Mission Maritime Aircraft* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prior year T&E cost no longer funded in the FYDP | Various | Various : Various | 39.471 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 39.471 | - |
| | | **Subtotal** | 236.011 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 236.011 | N/A |

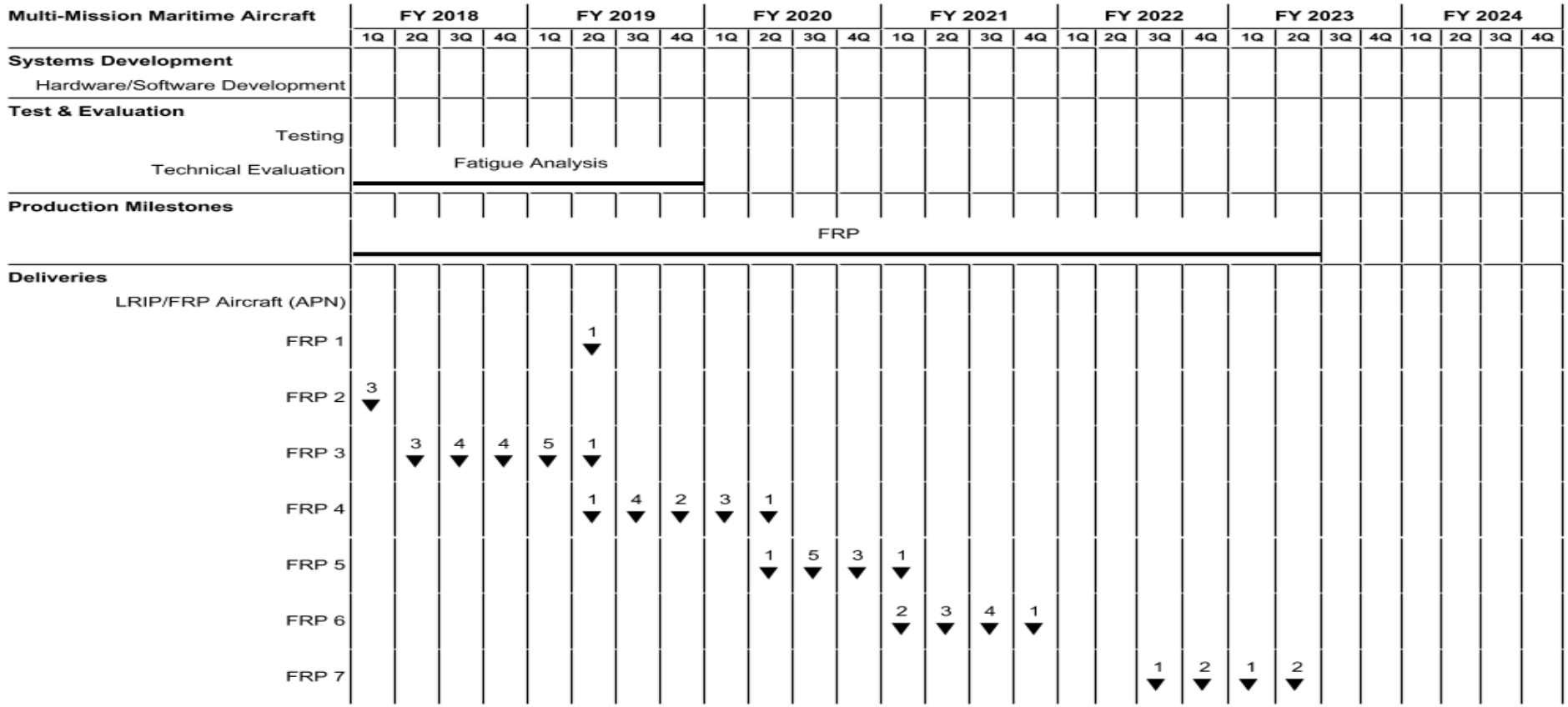
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mgmt Suppt Serv (NON-FFRDC) | C/CPFF | RBC INC : Alexandria, VA | 33.537 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 33.537 | 33.537 |
| Eng Tech Serv (NON-FFRDC) | C/CPFF | ASEC : Lexington Park MD | 11.453 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.453 | 11.453 |
| Program Mgmt Support | WR | NAWC AD : Pax River, MD | 53.231 | 0.360 | Nov 2017 | 0.160 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 53.751 | - |
| Travel | Allot | NAWC AD : Pax River, MD | 4.291 | 0.063 | Nov 2017 | 0.050 | Oct 2018 | 0.000 | | - | | 0.000 | 0.000 | 4.404 | - |
| Prior year Mgmt cost no longer funded in the FYDP | Various | Various : Various | 20.358 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 20.358 | - |
| | | **Subtotal** | 122.870 | 0.423 | | 0.210 | | 0.000 | | - | | 0.000 | 0.000 | 123.503 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 7,910.593 | 8.695 | | 7.466 | | 0.000 | | - | | 0.000 | 0.000 | 7,926.754 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>2696 / *Multi-Mission Maritime Aircraft* |




*2020PB - 0605500N - 2696*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>2696 / *Multi-Mission Maritime Aircraft* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Multi-Mission Maritime Aircraft*** | | | | |
| Test & Evaluation: Technical Evaluation: Fatigue Analysis | 1 | 2018 | 4 | 2019 |
| Production Milestones: Full Rate Production (FRP) | 1 | 2018 | 2 | 2023 |
| Deliveries: FRP 1: FRP Aircraft (APN) Q2 2019 | 2 | 2019 | 2 | 2019 |
| Deliveries: FRP 2: FRP Aircraft (APN) Q1 2018 | 1 | 2018 | 1 | 2018 |
| Deliveries: FRP 3: FRP Aircraft (APN) Q2 2018 | 2 | 2018 | 2 | 2018 |
| Deliveries: FRP 3: FRP Aircraft (APN) Q3 2018 | 3 | 2018 | 3 | 2018 |
| Deliveries: FRP 3: FRP Aircraft (APN) Q4 2018 | 4 | 2018 | 4 | 2018 |
| Deliveries: FRP 3: FRP Aircraft (APN) Q1 2019 | 1 | 2019 | 1 | 2019 |
| Deliveries: FRP 3: FRP Aircraft (APN) Q2 2019 | 2 | 2019 | 2 | 2019 |
| Deliveries: FRP 4: FRP Aircraft (APN) Q2 2019 | 2 | 2019 | 2 | 2019 |
| Deliveries: FRP 4: FRP Aircraft (APN) Q3 2019 | 3 | 2019 | 3 | 2019 |
| Deliveries: FRP 4: FRP Aircraft (APN) Q4 2019 | 4 | 2019 | 4 | 2019 |
| Deliveries: FRP 4: FRP Aircraft (APN) Q1 2020 | 1 | 2020 | 1 | 2020 |
| Deliveries: FRP 4: FRP Aircraft (APN) Q2 2020 | 2 | 2020 | 2 | 2020 |
| Deliveries: FRP 5: FRP Aircraft (APN) Q2 2020 | 2 | 2020 | 2 | 2020 |
| Deliveries: FRP 5: FRP Aircraft (APN) Q3 2020 | 3 | 2020 | 3 | 2020 |
| Deliveries: FRP 5: FRP Aircraft (APN) Q4 2020 | 4 | 2020 | 4 | 2020 |
| Deliveries: FRP 5: FRP Aircraft (APN) Q1 2021 | 1 | 2021 | 1 | 2021 |
| Deliveries: FRP 6: FRP Aircraft (APN) Q1 2021 | 1 | 2021 | 1 | 2021 |
| Deliveries: FRP 6: FRP Aircraft (APN) Q2 2021 | 2 | 2021 | 2 | 2021 |
| Deliveries: FRP 6: FRP Aircraft (APN) Q3 2021 | 3 | 2021 | 3 | 2021 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>2696 / *Multi-Mission Maritime Aircraft* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Deliveries: FRP 6: FRP Aircraft (APN) Q4 2021 | 4 | 2021 | 4 | 2021 |
| Deliveries: FRP 7: FRP Aircraft (APN) Q3 2022 | 3 | 2022 | 3 | 2022 |
| Deliveries: FRP 7: FRP Aircraft (APN) Q4 2022 | 4 | 2022 | 4 | 2022 |
| Deliveries: FRP 7: FRP Aircraft (APN) Q1 2023 | 1 | 2023 | 1 | 2023 |
| Deliveries: FRP 7: FRP Aircraft (APN) Q2 2023 | 2 | 2023 | 2 | 2023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | Project (Number/Name)<br>3368 / *P-8 Improvements* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3368: *P-8 Improvements* | 3.487 | 2.727 | 26.730 | 21.472 | - | 21.472 | 10.310 | 10.523 | 10.696 | 10.909 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The P-8A Multi-mission Maritime Aircraft (MMA) program also includes a sequence of Rapid Capability Insertions (RCI) and rapid development efforts to respond to evolving threats which will retain cost-wise effectiveness for winning major combat operations. In order to pace the threat, these efforts will incorporate incremental software and hardware improvements to existing sensors, communications systems, mission systems, weapons capabilities and Tactical Operations Center (TOC)/ TACMobile to build on the P-8A capability baseline. These capabilities, and other emergent capability requirements, will be prioritized either through the Navy Integration and Interoperability (I&I)-aligned Capability Prioritization Process (CPP), P-8A Tier 3 Capability Roadmap and/or through an Urgent Operational Need. The CPP process will be supported by detailed analysis and the maturation of developing technologies.

RCI 4 capabilities include Tactical Swap Application; Theatre ASW Application; PMA 264 Advanced Product Build (APB) which consists of MAC Continuous Active Sonar/Continuous CW transmission (CAS/CCW), SSQ-62 DICASS Auto Dect and MAC Adaptive Beamforming; Combat System Optimization and Digital Wideband Receiver (DWR).

Rapid Development efforts include Airborne Weapons Simulator and ASW Sonobuoy receiver digitization for SSQ-125A.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Perform technology demonstrations and analyses of proposed new capabilities | 2.099 | 25.926 | 20.589 | 0.000 | 20.589 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to develop RCIs and rapid development efforts to incrementally incorporate software and hardware improvements to build on the existing P-8A Capability Baseline. Begin full scale development and integration of Airborne Weapons Simulator (AWS) capability and RCI-4 to include MAC/Non-Acoustic enhancements and Theatre ASW interoperability improvements. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue to develop RCI packages and rapid development efforts to incrementally incorporate software and hardware capability improvements, building on the P-8A Baseline to ensure ongoing relevance of the P-8A | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>3368 / *P-8 Improvements* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| capability. Continue full scale development and integration of AWS capability and RCI-4 to include MAC/Non-Acoustic enhancements and Theatre ASW interoperability improvements.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>FY 2020 funds the Airborne Weapons Simulator development enabling crew weapons currency and proficiency for all P-8A weapons via decreasing future weapons procurement training costs. FY 2020 also continues to fund the Sonobuoy receiver digitization to "harden" the Sonobuoy signals and enable follow-on encryption of Sonobuoy signals thus increasing resistance to cyber-attack. | | | | | |
| ***Title:*** Conduct technical, cost, risk and logistics analysis of proposed technologies | 0.628 | 0.804 | 0.883 | 0.000 | 0.883 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Conduct technical, cost, risk and logistics analysis of proposed technologies. Evaluate system requirements through cost/performance trade-off analysis. Provide technical and management support for the development of acquisition documentation. Provide engineering and management of technical development effort. Increase in government led prototyping.<br>***FY 2020 Base Plans:***<br>Conduct technical, cost, risk and logistics analysis of proposed technologies. Evaluate system requirements through cost/performance trade-off analysis. Provide technical and management support for the development of acquisition documentation. Provide engineering and management of technical development effort. Increase in government led prototyping.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Minor increase of $.115 million due to continued execution of program requirements. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.727 | 26.730 | 21.472 | 0.000 | 21.472 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>3368 / *P-8 Improvements* |

**C. Other Program Funding Summary ($ in Millions)**

**Remarks**

**D. Acquisition Strategy**

The P-8A MMA program also includes a sequence of RCI and rapid development efforts to respond to evolving threats which will retain cost-wise effectiveness for winning major combat operations beyond 2020. In order to pace the threat, these efforts will incorporate incremental software and hardware improvements to existing sensors, communications systems, mission systems, weapons capabilities and Tactical Operations Center (TOC) to build on the P-8A capability baseline. These capabilities, and other emergent capability requirements, will be prioritized through the Navy I&I-aligned Capability Prioritization Process (CPP), P-8A Tier 3 Capability Roadmap and/or through an Urgent Operational Need. The CPP process will be supported by detailed analysis and the maturation of developing technologies.

**E. Performance Metrics**

Complete ABA prototyping on capabilities beyond Increment 3 (PE 0605504N).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>3368 / *P-8 Improvements* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW/SW Dev - P-8 Improvements | Various | Various : Various | 0.474 | 0.182 | Nov 2017 | 0.244 | Nov 2018 | 0.652 | Nov 2019 | - | | 0.652 | 1.199 | 2.751 | - |
| Primary HW/SW Dev - RCI-4 ASW Enhancements | C/CPFF | CTI : California, MD | 0.578 | 1.227 | Feb 2018 | 2.716 | Feb 2019 | 1.099 | Feb 2020 | - | | 1.099 | 2.395 | 8.015 | 8.015 |
| Primary SW Dev -Airborne Weapons Simulator | C/CPFF | Boeing : Seattle, WA | 0.000 | 0.000 | | 20.000 | Jun 2019 | 11.300 | May 2020 | - | | 11.300 | 0.000 | 31.300 | 34.400 |
| Primary SW Dev - ASW Sonobuoy Receiver Digitization | TBD | Boeing : Seattle, WA | 0.000 | 0.000 | | 0.000 | | 3.800 | Mar 2020 | - | | 3.800 | 1.300 | 5.100 | - |
| RCI 4 | TBD | TBD : TBD | 0.000 | 0.000 | | 0.653 | Jun 2019 | 1.800 | Mar 2020 | - | | 1.800 | 20.851 | 23.304 | - |
| Sys Eng - Gov | WR | NAWCAD : Pax River, MD | 0.406 | 0.690 | Nov 2017 | 2.313 | Nov 2018 | 1.938 | Nov 2019 | - | | 1.938 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 1.458 | 2.099 | | 25.926 | | 20.589 | | - | | 20.589 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eng Tech Serv (NON-FFRDC) | C/CPFF | Sabre, Inc : Warrington, PA | 0.486 | 0.284 | Nov 2017 | 0.320 | Nov 2018 | 0.290 | Nov 2019 | - | | 0.290 | 1.284 | 2.664 | 2.679 |
| Mgmt Support Serv | C/CPFF | RBC : Alexandria, VA | 0.451 | 0.118 | Nov 2017 | 0.153 | Nov 2018 | 0.333 | Nov 2019 | - | | 0.333 | 1.486 | 2.541 | 2.562 |
| Program Mgmt Support | WR | NAWCAD : Pax River, MD | 1.092 | 0.226 | Nov 2017 | 0.331 | Nov 2018 | 0.260 | Nov 2019 | - | | 0.260 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 2.029 | 0.628 | | 0.804 | | 0.883 | | - | | 0.883 | Continuing | Continuing | N/A |

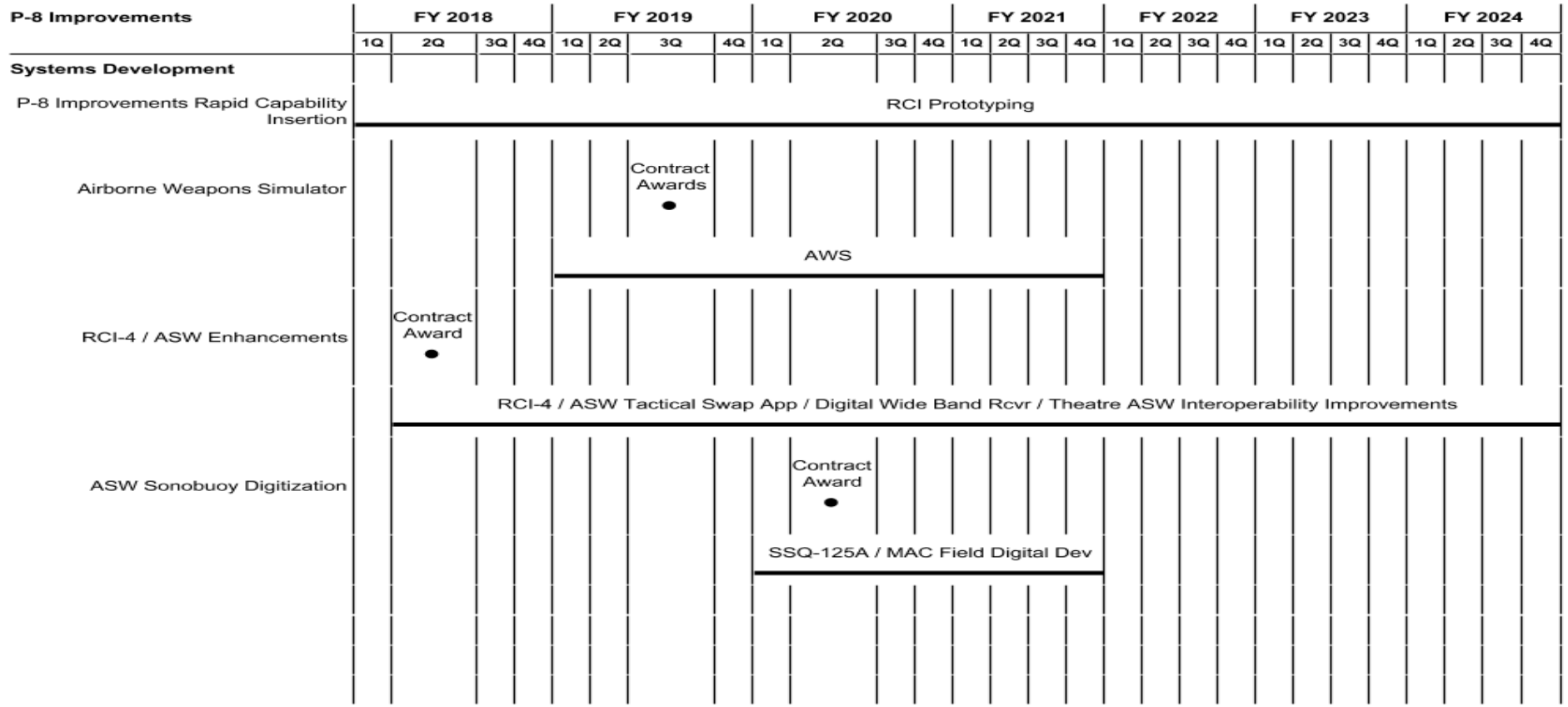
| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 3.487 | 2.727 | | 26.730 | | 21.472 | | - | | 21.472 | Continuing | Continuing | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | Project (Number/Name)<br>3368 / *P-8 Improvements* | |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>3368 / *P-8 Improvements* |




*2020PB - 0605500N - 3368*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605500N / *Multi-mssn Maritime Aircraft (MMA) (P-8A)* | **Project (Number/Name)**<br>3368 / *P-8 Improvements* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***P-8 Improvements*** | | | | |
| Systems Development: P-8 Improvements Rapid Capability Insertion: RCI-4 Prototyping | 1 | 2018 | 4 | 2024 |
| Systems Development: Airborne Weapons Simulator: Contract Awards | 3 | 2019 | 3 | 2019 |
| Systems Development: Airborne Weapons Simulator: Airborne Weapons Simulator | 1 | 2019 | 4 | 2021 |
| Systems Development: RCI-4 / ASW Enhancements: Contract Award | 2 | 2018 | 2 | 2018 |
| Systems Development: RCI-4 / ASW Enhancements: RCI-4 / ASW Enhancements | 2 | 2018 | 4 | 2024 |
| Systems Development: ASW Sonobuoy Digitization: Contract Award | 2 | 2020 | 2 | 2020 |
| Systems Development: ASW Sonobuoy Digitization: ASW Sonobuoy Digitization | 1 | 2020 | 4 | 2021 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605504N *I (U)Multi-Mission Maritime (MMA) Increment III* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 199.930 | 123.752 | 163.809 | 177.234 | - | 177.234 | 145.254 | 123.514 | 126.014 | 133.623 | Continuing | Continuing |
| 3218: *P-8A Spiral 2 Development* | 199.930 | 123.752 | 158.809 | 177.234 | - | 177.234 | 145.254 | 123.514 | 126.014 | 133.623 | Continuing | Continuing |
| 9999: *Congressional Adds* | 0.000 | 0.000 | 5.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.000 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 334 | | | | | | | | | | | | |

**A. Mission Description and Budget Item Justification**

The P-8A Increment 3 program consists of incremental enhancement Engineering Change Proposals (ECPs) to system capabilities that will retain cost-wise effectiveness for major combat operations. Increment 3 will incorporate improvements to aircraft systems including significant war-altering Anti-Submarine Warfare (ASW) capabilities of Enhanced Multi-Static Active Coherent (MAC) and ASW Signal Intelligence (SIGINT) which are enabled by the incorporation of Combat System hardware and architecture improvements, ASW and Anti-Surface Warfare (ASuW) sensor improvements, communication capability upgrades, ASuW Net Enabled Weapon (NEW), and Higher-Than-Secret (HTS) security capability.

These capabilities will be developed as a series of ECPs for the P-8A and are as follows:
- ECP 4 - Software upgrades to Narrowband SATCOM and Radar Targeting. (FIELDED FY18)
- ECP 5 - Net Enabled Weapon Data Link, High Frequency radio Internet Protocol (HF-IP), Integrated Broadcast Service (IBS) filtering, IBS receiver, and Harpoon II+. (TO BE FIELDED FY20)
- ECP 6 - ASW SIGINT, Anti-Submarine Warfare (ASW) capability, Wide Band SATCOM, Higher Than Secret (HTS) processing, Enhanced track management (Minotaur), Applications Based Architecture (ABA) and Combat System.
- ECP 7 - Enhanced Multi-Static Active Coherent (MAC).

To expedite fielding capability to the P-8A Fleet, ECPs 4, 5, and 6 are executed concurrently as these capabilities are independent of one another. However, Enhanced MAC (ECP 7) is reliant on ECP 6's Combat System hardware and architecture to operate on the P-8A. Both ECP 6 and ECP 7 are integrated via the Platform Integration contract planned to be awarded 2Q FY2019. ECP 6 integration activities will begin 1Q FY2019 with initiation of the Government Lead Capability Integrator (LCI) integration and upon award of the Platform Integration (PI) contract in 2Q FY2019. ECP 7 integration activities will begin 1Q 2020. Enhanced MAC (ECP 7) is developed within Program Element (PE) 0604261N and integrated via the Platform Integration contract within this PE.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605504N *I (U)Multi-Mission Maritime (MMA) Increment III* |

Note: This PE was re-phased due to Congressional adjustments through FY2018 which changed the FY2019 and FY2020 plans.
Note: ECP 6 fielding in 1Q2024 includes 7 aircraft (1 squadron) modified, trained and ready to deploy.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 181.731 | 160.389 | 149.138 | - | 149.138 |
| Current President's Budget | 123.752 | 163.809 | 177.234 | - | 177.234 |
| Total Adjustments | -57.979 | 3.420 | 28.096 | - | 28.096 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -1.580 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 5.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -2.979 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | 9.999 | - | 9.999 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 18.097 | - | 18.097 |
| • Congressional Directed Reductions Adjustments | -55.000 | - | - | - | - |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2018 | FY 2019 |
|---|---|---|
| **Project:** 9999: *Congressional Adds* | | |
| Congressional Add: *New Design SSN SBIR (Cong)* | 0.000 | 5.000 |
| Congressional Add Subtotals for Project: 9999 | 0.000 | 5.000 |
| Congressional Add Totals for all Projects | 0.000 | 5.000 |

**Change Summary Explanation**

Schedule Changes:
1) Platform Integration scheduled for 2Q FY2019 to reflect current planned execution
2) Government LCI Integration milestone added to reflect planned Government activities
3) Integrated Flight Test & Evaluation ECP 5 scheduled to complete 3Q FY2020 to reflect continued Harpoon flight test
4) Delayed Fielding ECP 5 scheduled for 3Q 2020

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | Project (Number/Name)<br>3218 / *P-8A Spiral 2 Development* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3218: *P-8A Spiral 2 Development* | 199.930 | 123.752 | 158.809 | 177.234 | - | 177.234 | 145.254 | 123.514 | 126.014 | 133.623 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 334

**A. Mission Description and Budget Item Justification**

The P-8A Increment 3 program consists of incremental enhancement Engineering Change Proposals (ECPs) to system capabilities that will retain cost-wise effectiveness for major combat operations. Increment 3 will incorporate improvements to aircraft systems including significant war-altering Anti-Submarine Warfare (ASW) capabilities of Enhanced Multi-Static Active Coherent (MAC) and ASW Signal Intelligence (SIGINT) which are enabled by the incorporation of Combat System hardware and architecture improvements, ASW and Anti-Surface Warfare (ASuW) sensor improvements, communication capability upgrades, ASuW Net Enabled Weapon (NEW), and Higher-Than-Secret (HTS) security capability.

These capabilities will be developed as a series of ECPs for the P-8A and are as follows:
- ECP 4 - Software upgrades to Narrowband SATCOM and Radar Targeting. (FIELDED FY18)
- ECP 5 - Net Enabled Weapon Data Link, High Frequency radio Internet Protocol (HF-IP), Integrated Broadcast Service (IBS) filtering, IBS receiver, and Harpoon II+. (TO BE FIELDED FY20)
- ECP 6 - ASW SIGINT, Anti-Submarine Warfare (ASW) capability, Wide Band SATCOM, Higher Than Secret (HTS) processing, Enhanced track management (Minotaur), Applications Based Architecture (ABA) and Combat System.
- ECP 7 - Enhanced Multi-Static Active Coherent (MAC).

To expedite fielding capability to the P-8A Fleet, ECPs 4, 5, and 6 are executed concurrently as these capabilities are independent of one another. However, Enhanced MAC (ECP 7) is reliant on ECP 6's Combat System hardware and architecture to operate on the P-8A. Both ECP 6 and ECP 7 are integrated via the Platform Integration contract planned to be awarded 2Q FY2019. ECP 6 integration activities will begin 1Q FY2019 with initiation of the Government Lead Capability Integrator (LCI) integration and upon award of the Platform Integration (PI) contract in 2Q FY2019. ECP 7 integration activities will begin 1Q 2020. Enhanced MAC (ECP 7) is developed within Program Element (PE) 0604261N and integrated via the Platform Integration contract within this PE.

Note: This PE was re-phased due to Congressional adjustments through FY2018 which changed the FY19 and FY20 plans.
Note: ECP 6 fielding in 1Q2024 includes 7 aircraft (1 squadron) modified, trained and ready to deploy.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 113.077 | 146.836 | 154.613 | 0.000 | 154.613 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>3218 / *P-8A Spiral 2 Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Initiation of the Government LCI integration activities. Award Platform Integration (PI) contract with Boeing to integrate primarily government developed ECP 6 capability into the P-8A. Continue ECP-5 integration and test efforts. Begin ECP 6 integration activities. Note: ECP 6 enables most of the warfighting capability improvements that Increment 3 brings to the P-8. Continue Government-led LCI efforts, associated ground support, TOC, and training systems upgrades.<br>***FY 2020 Base Plans:***<br>Complete ECP 5 integration, test efforts and fielding. Continue ECP 6 integration on the Platform Integration (PI) contract and initiate ECP 7 integration efforts. Continue Government-led LCI efforts, associated ground support, TOC, and training systems upgrades.<br>***FY 2020 OCO Plans:***<br>Not applicable.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>This increase of $7.777 million is due to increased ECP 6 and LCI integration activities. Note: ECP 6 enables most of the warfighting capability improvements that Increment 3 brings to the P-8. | | | | | |
| ***Title:*** Support/Test & Evaluation/Management Services | 10.675 | 11.973 | 22.621 | 0.000 | 22.621 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue associated in-house government LCI/T&E/management activities.<br>***FY 2020 Base Plans:***<br>Continue associated in-house government LCI/T&E/management activities.<br>***FY 2020 OCO Plans:***<br>Not applicable.<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>This increase of $10.648 million is driven by increased test requirements for ECP 5 (primarily Harpoon) combined with initiation of test planning efforts for ECP 6. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 123.752 | 158.809 | 177.234 | 0.000 | 177.234 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>3218 / *P-8A Spiral 2 Development* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • APN/0586: *P-8 Series* | 14.783 | 67.416 | 107.423 | - | 107.423 | 216.964 | 296.070 | 339.155 | 347.788 | 1,688.570 | 3,166.488 |

**Remarks**

BLI0586 reflects the P-8A total program funding not just Increment 3.

**D. Acquisition Strategy**

In 2016 USD AT&L directed Increment 3 efforts to be merged into the P-8 MDAP with capabilities delivered as a series of Engineering Change Proposals (ECPs). Increment 3 capabilities were broken into ECPs 4-7 to expedite delivery to the Fleet. P-8A is an ACAT IC program under the MDA oversight of ASN (RDA). As part of that program Increment 3 is subject to all of the same statutory and regulatory reporting requirements as it would be as a separate MDAP. P-8A completed its most recent annual MDAP Gate 6 review in November 2018. Each Increment 3 ECP is a separate effort with its own development, integration, fielding, and sustainment activities.

**E. Performance Metrics**

Continue development of capability ECPs.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>3218 / *P-8A Spiral 2 Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Hdw Dev - RR Interface | C/CPIF | Boeing : Seattle, WA | 5.803 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.803 | 5.803 |
| Primary HW Dev - Capability Analysis | C/CPFF | Boeing : Seattle, WA | 8.917 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.917 | 8.917 |
| Primary HW Dev - Capability Dev & Integration | C/CPFF | Boeing : Seattle, WA | 50.626 | 40.802 | Oct 2017 | 49.206 | Oct 2018 | 24.998 | Oct 2019 | - | | 24.998 | 0.000 | 165.632 | 165.632 |
| Primary HW Dev - Trainer Dev & Integration | TBD | Boeing : St. Louis, MO | 0.000 | 0.000 | | 5.000 | Jan 2019 | 13.858 | Mar 2020 | - | | 13.858 | 71.555 | 90.413 | 90.413 |
| Primary HW Dev - ABA SW Dev Vendor A | C/CPIF | Raytheon : Dallas, TX | 5.986 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.986 | 5.986 |
| Primary HW Dev - ABA SW Dev Vendor B | C/CPIF | Lockheed Martin : Manassas, VA | 10.086 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 10.086 | 10.086 |
| Primary HW Dev - Combat Systems Hardware Effort | Various | NSWC : Crane, IN | 7.636 | 25.777 | Oct 2017 | 20.803 | Oct 2018 | 10.818 | Oct 2019 | - | | 10.818 | 10.000 | 75.034 | - |
| Primary HW Dev - Platform Integration | C/CPFF | Boeing : Seattle, WA | 0.000 | 0.000 | | 30.542 | Feb 2019 | 65.006 | Oct 2019 | - | | 65.006 | 246.855 | 342.403 | 342.403 |
| Primary HW Dev - Wideband SATCOM Terminal | C/CPFF | AMEWAS : California, MD | 6.772 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 6.772 | 6.772 |
| RCI2 - ECP3 | C/CPFF | Boeing : Seattle, WA | 17.317 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.317 | 17.317 |
| LCI Development & Integration | Various | Various : Various | 42.636 | 29.722 | Oct 2017 | 23.453 | Oct 2018 | 22.103 | Oct 2019 | - | | 22.103 | 68.908 | 186.822 | - |
| Sys Eng (gov) | WR | NAWC AD : Pax River, MD | 26.219 | 16.776 | Nov 2017 | 17.832 | Nov 2018 | 17.830 | Nov 2019 | - | | 17.830 | 50.255 | 128.912 | - |
| | | **Subtotal** | 181.998 | 113.077 | | 146.836 | | 154.613 | | - | | 154.613 | 447.573 | 1,044.097 | N/A |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | Project (Number/Name)<br>3218 / *P-8A Spiral 2 Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Sup | WR | NAWC AD : Pax River, MD | 1.708 | 0.356 | Nov 2017 | 0.918 | Nov 2018 | 0.918 | Nov 2019 | - | | 0.918 | 2.754 | 6.654 | - |
| Studies & Analysis | C/CPFF | JHU : Pax River, MD | 6.717 | 2.232 | Nov 2017 | 2.250 | Nov 2018 | 2.318 | Nov 2019 | - | | 2.318 | 0.000 | 13.517 | 13.517 |
| | | **Subtotal** | 8.425 | 2.588 | | 3.168 | | 3.236 | | - | | 3.236 | 2.754 | 20.171 | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dev Test & Eval | WR | NAWC AD : Pax River, MD | 5.034 | 4.938 | Nov 2017 | 5.647 | Nov 2018 | 8.682 | Nov 2019 | - | | 8.682 | Continuing | Continuing | Continuing |
| GFE/GFI/GFP | WR | NAWC AD : Pax River, MD | 1.215 | 1.787 | Nov 2017 | 1.198 | Nov 2018 | 4.713 | Nov 2019 | - | | 4.713 | 28.051 | 36.964 | - |
| Oper Test & Eval | WR | NAWC AD : Pax River, MD | 0.000 | 0.000 | | 0.000 | | 1.964 | Nov 2019 | - | | 1.964 | 23.570 | 25.534 | - |
| Test Assets | WR | NAWC AD : Pax River, MD | 0.000 | 0.000 | | 0.000 | | 0.885 | Nov 2019 | - | | 0.885 | 20.593 | 21.478 | - |
| | | **Subtotal** | 6.249 | 6.725 | | 6.845 | | 16.244 | | - | | 16.244 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eng Tech Serv (NON-FFRDC) | C/CPFF | Various : Various | 0.118 | 0.072 | Nov 2017 | 0.000 | Nov 2018 | 0.000 | | - | | 0.000 | 0.000 | 0.190 | 0.190 |
| Mgmt Suppt Serv (NON-FFRDC) | C/CPFF | RBC : Alexandria, VA | 1.996 | 0.590 | Nov 2017 | 1.260 | Nov 2018 | 2.377 | Nov 2019 | - | | 2.377 | 4.831 | 11.054 | 11.054 |
| Program Mgmt Support | WR | NAWC AD : Pax River, MD | 1.125 | 0.600 | Nov 2017 | 0.600 | Nov 2018 | 0.664 | Nov 2019 | - | | 0.664 | 1.992 | 4.981 | - |
| Travel | Allot | NAWC AD : Pax River, MD | 0.019 | 0.100 | Nov 2017 | 0.100 | Nov 2018 | 0.100 | Nov 2019 | - | | 0.100 | 0.400 | 0.719 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>3218 / *P-8A Spiral 2 Development* |

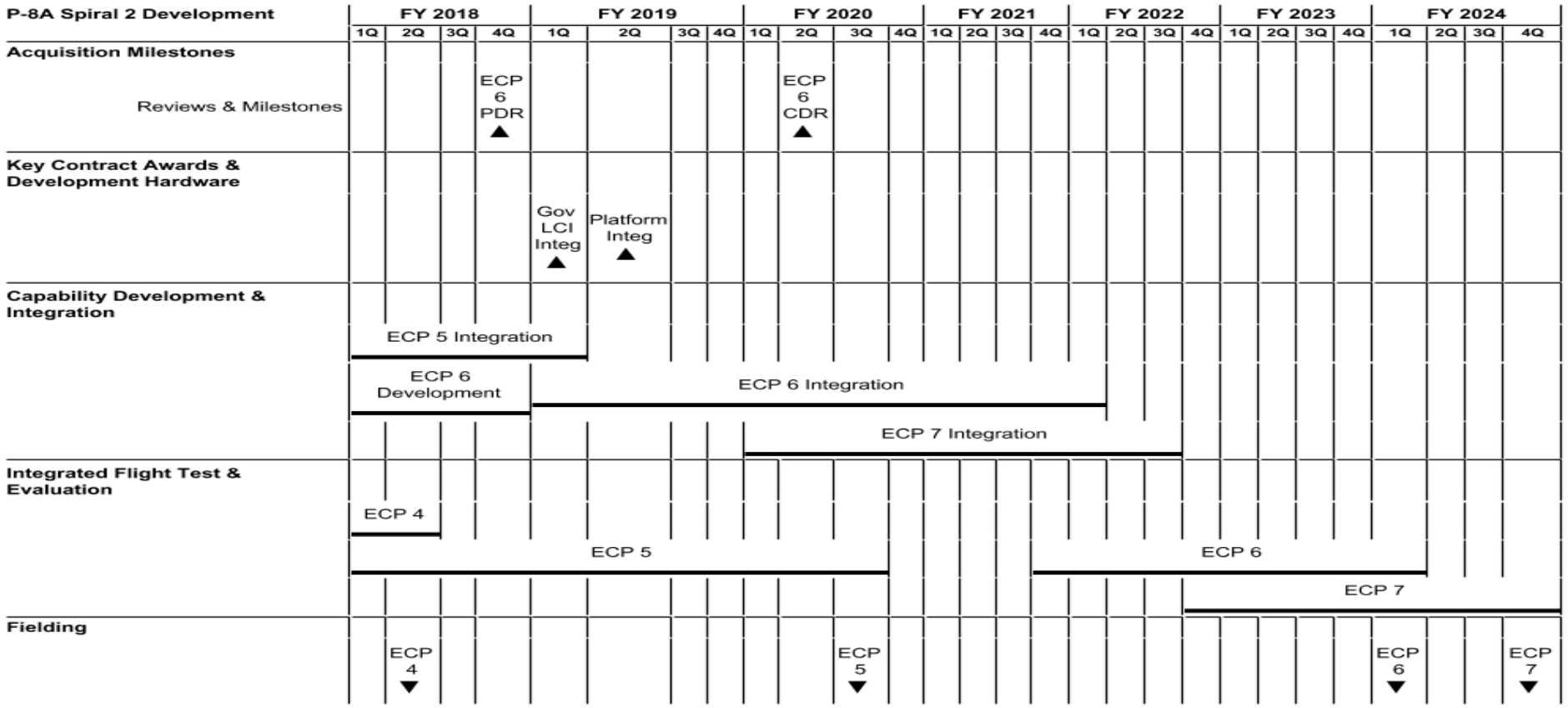
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 3.258 | 1.362 | | 1.960 | | 3.141 | | - | | 3.141 | 7.223 | 16.944 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 199.930 | 123.752 | | 158.809 | | 177.234 | | - | | 177.234 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>3218 / *P-8A Spiral 2 Development* |




*2020PB - 0605504N - 3218*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>3218 / *P-8A Spiral 2 Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***P-8A Spiral 2 Development*** | | | | |
| Acquisition Milestones: Reviews & Milestones: ECP 6 Preliminary Design Review (PDR) | 4 | 2018 | 4 | 2018 |
| Acquisition Milestones: Reviews & Milestones: ECP 6 Critical Design Review (CDR) | 2 | 2020 | 2 | 2020 |
| Key Contract Awards & Development Hardware: Platform Integration | 2 | 2019 | 2 | 2019 |
| Key Contract Awards & Development Hardware: Government LCI Integration | 1 | 2019 | 1 | 2019 |
| Capability Development & Integration: ECP 5 Integration | 1 | 2018 | 1 | 2019 |
| Capability Development & Integration: ECP 6 Development | 1 | 2018 | 4 | 2018 |
| Capability Development & Integration: ECP 6 Integration | 1 | 2019 | 1 | 2022 |
| Capability Development & Integration: ECP 7 Integration | 1 | 2020 | 3 | 2022 |
| Integrated Flight Test & Evaluation: ECP 4 | 1 | 2018 | 2 | 2018 |
| Integrated Flight Test & Evaluation: ECP 5 | 1 | 2018 | 3 | 2020 |
| Integrated Flight Test & Evaluation: ECP 6 | 4 | 2021 | 1 | 2024 |
| Integrated Flight Test & Evaluation: ECP 7 | 4 | 2022 | 4 | 2024 |
| Fielding: ECP 4 | 2 | 2018 | 2 | 2018 |
| Fielding: ECP 5 | 3 | 2020 | 3 | 2020 |
| Fielding: ECP 6 | 1 | 2024 | 1 | 2024 |
| Fielding: ECP 7 | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | Project (Number/Name)<br>9999 / *Congressional Adds* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9999: *Congressional Adds* | 0.000 | 0.000 | 5.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 5.000 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Congressional Add to enable small business support to P-8A Increment 3 development of Applications Based Architecture (ABA) components.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2018 | FY 2019 |
|---|---|---|
| ***Congressional Add:*** New Design SSN SBIR (Cong) | 0.000 | 5.000 |
| ***FY 2018 Accomplishments:*** N/A | | |
| ***FY 2019 Plans:*** ABA based applications and capability development, integration and test to incrementally incorporate software improvements in support of P-8A Increment 3 Combat Systems. | | |
| **Congressional Adds Subtotals** | 0.000 | 5.000 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

The ABA will be fielded as part of the P-8A Increment 3 Block 2 (ECP 6) modification to delivered aircraft.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary HW Dev - Progeny | C/CPFF | PROGENY : Manassas, VA | 0.000 | 0.000 | | 4.500 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 4.500 | - |
| Primary HW Dev | WR | NAWC AD : Pax River, MD | 0.000 | 0.000 | | 0.024 | Jan 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.024 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 4.524 | | 0.000 | | - | | 0.000 | 0.000 | 4.524 | N/A |

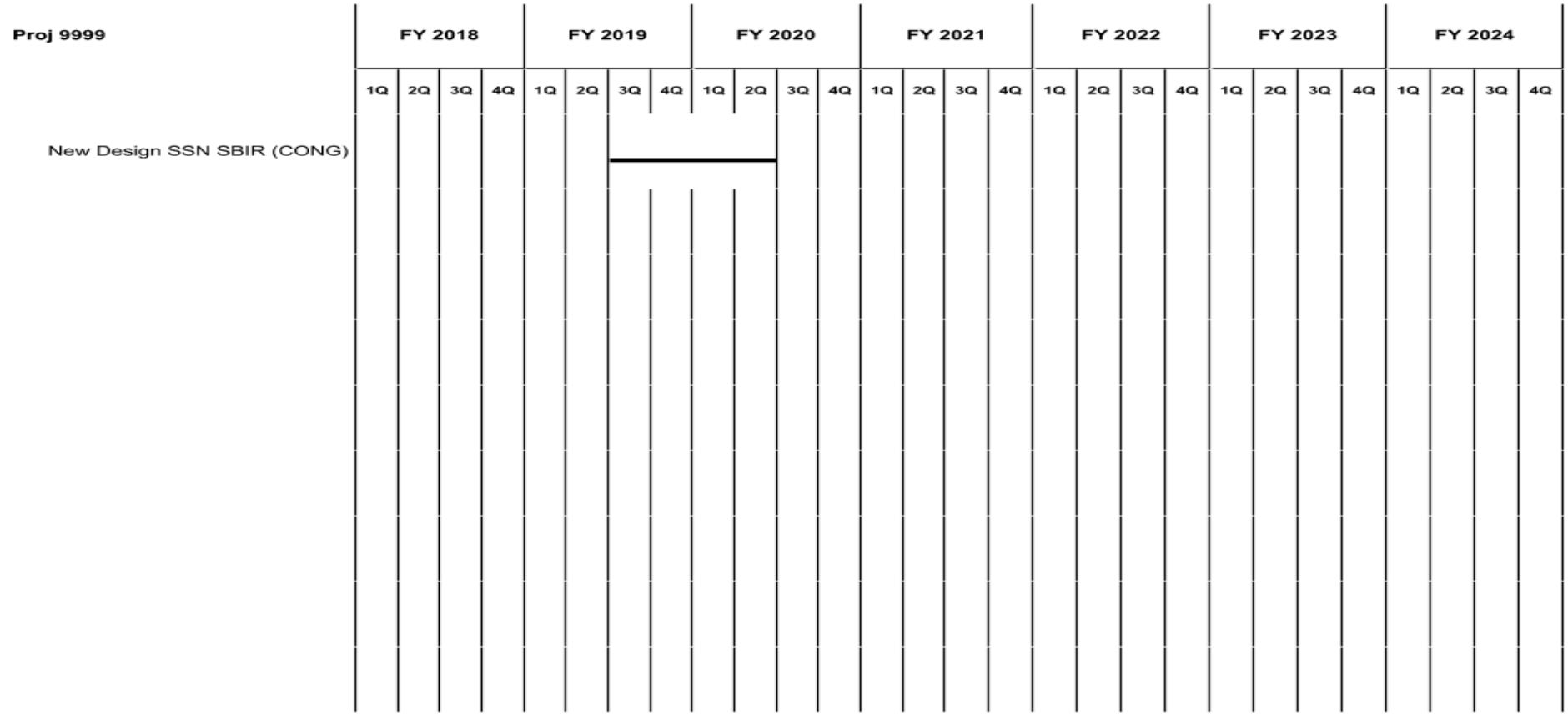
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mgmt Suppt Serv (NON-FFRDC) | C/CPFF | RBC : Alexandria, VA | 0.000 | 0.000 | | 0.476 | Jun 2019 | 0.000 | | - | | 0.000 | 0.000 | 0.476 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.476 | | 0.000 | | - | | 0.000 | 0.000 | 0.476 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 5.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.000 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |




*2020PB - 0605504N - 9999*

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605504N / *(U)Multi-Mission Maritime (MMA) Increment III* | **Project (Number/Name)**<br>9999 / *Congressional Adds* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 9999*** | | | | |
| New Design SSN SBIR (CONG): Schedule Detail | 3 | 2019 | 2 | 2020 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605611M *I (U) MC AVS Development & Demonstration* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 150.381 | 66.137 | 77.322 | - | 77.322 | 59.517 | 43.940 | 8.202 | 8.498 | Continuing | Continuing |
| 0025: *Amphibious Combat Vehicle 1.1* | 0.000 | 150.381 | 42.448 | 23.299 | - | 23.299 | 0.060 | 0.000 | 0.000 | 0.000 | 0.000 | 216.188 |
| 0026: *Amphibious Combat Vehicle 1.2* | 0.000 | 0.000 | 23.689 | 54.023 | - | 54.023 | 59.457 | 43.940 | 8.202 | 8.498 | Continuing | Continuing |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** P472 | | | | | | | | | | | | |

**Note**

Beginning in FY 2018, the program funding transitions from Program Element 0603611M Marine Corps Assault Vehicles to Program Element 0605611M MC AVS Development and Demonstration as the program proceeds through the acquisition process.

**A. Mission Description and Budget Item Justification**

The Amphibious Combat Vehicle is an armored personnel carrier, balanced in performance, protection, and payload for employment within the Ground Combat Element (GCE) and throughout the range of military operations, to include a swim capability.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 178.993 | 98.223 | 77.681 | - | 77.681 |
| Current President's Budget | 150.381 | 66.137 | 77.322 | - | 77.322 |
| Total Adjustments | -28.612 | -32.086 | -0.359 | - | -0.359 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -32.086 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -1.589 | 0.000 | | | |
| • SBIR/STTR Transfer | -6.023 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.355 | - | -0.355 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.004 | - | -0.004 |
| • Congressional Directed Reductions Adjustments | -21.000 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605611M *I (U) MC AVS Development & Demonstration* |

**Change Summary Explanation**

The FY2020 funding request was reduced by $3.30M to account for the availability of prior year execution balances.

The increase from FY 2019 to FY 2020 of $11.185M is primarily attributed to a decrease in ACV 1.1 based on completion of corrective action modifications and the transition to Full Up System Level (FUSL) testing and Initial Operational Test & Evaluation (IOT&E) and an increase in ACV 1.2 associated with procurement of ACV Mission Role Variant test articles, associated GFE, and initiation of a Vehicle Protective System trade study and integration efforts.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | Project (Number/Name)<br>0025 / *Amphibious Combat Vehicle 1.1* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0025: *Amphibious Combat Vehicle 1.1* | 0.000 | 150.381 | 42.448 | 23.299 | - | 23.299 | 0.060 | 0.000 | 0.000 | 0.000 | 0.000 | 216.188 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** P472

**Note**

Beginning in FY 2018, the program funding transitions from Program Element 0603611M Marine Corps Assault Vehicles to Program Element 0605611M MC AVS Development and Demonstration as the program proceeds through the acquisition process.

**A. Mission Description and Budget Item Justification**

The Amphibious Combat Vehicle (ACV) will be a partial and complementary replacement for the legacy Assault Amphibious Vehicle (AAV) battalions within the Marine Divisions. ACV-equipped AA companies will provide protected mobility and general support lift to elements of Marine Infantry Battalions. The ACV, an advanced generation, eight-wheeled
armored personnel carrier, will mitigate current and projected capability gaps by providing improved lethality against dismounted enemy troops, more effective land and water tactical mobility, and increased force protection and survivability from blast, fragmentation, and kinetic energy threats. ACV is structured to be executed in multiple increments, with the first increment designed to provide an initial operational capability of personnel carriers. Subsequent increments are planned to provide additional personnel carriers and to develop Mission Role Variants (MRVs), such as command and control and tactical recovery capabilities.

The decrease in ACV 1.1 from FY 2019 to FY 2020 is primarily attributed to completion of corrective action modifications and the transition to Full Up System Level (FUSL) testing and Initial Operational Test & Evaluation (IOT&E).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Development | 104.730 | 13.844 | 1.764 | 0.000 | 1.764 |
| ***Articles:*** | 4 | - | - | - | - |
| ***Description:*** System Design and Development; Engineering and Manufacturing Development (EMD) test vehicle manufacturing; prime contractor Developmental and Operational test support, and development of Logistics Management Information (LMI) data. | | | | | |
| ***FY 2019 Plans:***<br>- Complete corrective action modifications which resulted from Reliability Growth Testing (RGT). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Continue Advance Capabilities Improvements for the down-selected contractor.<br>***FY 2020 Base Plans:***<br>- Complete Advance Capabilities improvements, Developmental Test (DT), and LFT&E support for the down-selected vendor.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in System Design and Development between FY2019 and FY2020 ($12.080) is attributed to completion of the design and development phase of the program in FY2020. | | | | | |
| ***Title:*** Management Services | 14.018 | 2.000 | 2.533 | 0.000 | 2.533 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Contract Advisory and Assistance Services (Engineering and Technical Support, Management Support Services, and Studies and Analyses).<br>***FY 2019 Plans:***<br>- Continue business, acquisition, logistics, and engineering related activities for program document development, program analysis, acquisition logistics management, and financial management support.<br>- Continue engineering and technical services for logistical, maintenance support, and integration.<br>- Continue force protection modeling and simulation activities.<br>- Continue analyses of product support elements to support Maintenance Plan development, Support and Test Equipment, Calibration, and other logistics elements.<br>***FY 2020 Base Plans:***<br>- Continue business, acquisition, logistics, and engineering related activities for program document development, program analysis, acquisition logistics management, and financial management support.<br>- Continue engineering and technical services for logistical, maintenance support, and integration.<br>- Continue force protection modeling and simulation activities.<br>- Continue analyses of product support elements to support Maintenance Plan development, Support and Test Equipment, Calibration, and other logistics elements.<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase in Management Services between FY 2019 and FY 2020 ($0.533M) is due to a decrease in Engineering and Technical Services ($0.555), an increase in Management Services ($0.788) and an increase in Studies & Analyses ($0.300M). The decrease in Engineering and Technical Services is attributed to completion of engineering services in support of the development program in FY 2020; the increase in Management Services ($0.788) is attributed to continued business, acquisition, logistics and engineering related support during conduct of IOT&E in FY 2020; the increase in Studies & Analyses ($0.300) is due to logistics-related analyses in support of system fielding. | | | | | |
| ***Title:*** Program Support | 8.635 | 4.591 | 2.326 | 0.000 | 2.326 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Government labor, material, and travel for Integrated Logistics Support, Technical Publications, Support Equipment development, In-house Technical Support, and Program Management Support.<br><br>***FY 2019 Plans:***<br>- Continue Engineering Support for communication suite integration efforts documented during technical information and review meetings.<br>- Continue procurement, inventory, checkout, kitting, shipment, and troubleshooting of ACV 1.1 communications suite GFP<br>- Continue Reliability, Availability, Maintainability, and Durability (RAM-D), and Human Systems Integration (HSI) activities for ACV 1.1.<br>- Continue Digital Integrated Facility (DIF) architecture support.<br>- Continue technical support for training packages.<br><br>***FY 2020 Base Plans:***<br>- Complete Engineering Support for communication suite integration efforts documented during technical information and review meetings.<br>- Complete procurement, inventory, checkout, kitting, shipment, and troubleshooting of ACV 1.1 communications suite GFP<br>- Complete RAM-D, and HSI for ACV 1.1.<br>- Complete DIF architecture support. | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Complete technical support for training packages.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in Program Support between FY2019 and FY2020 ($2.265) is attributed to completion of armor life/durability characterization; decreased field service representatives, and spares support for communications suites and remote weapon stations. | | | | | |
| ***Title:*** Test & Evaluation | 22.998 | 22.013 | 16.676 | 0.000 | 16.676 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Government Developmental Test (DT), Operational Assessment (OA), and Live Fire Test and Evaluation (LFT&E) activities.<br>***FY 2019 Plans:***<br>- Continue LFT&E activities (armor coupon testing, exploitation shots, fire survivability, system level testing, etc.) for down-selected contractor.<br>- Continue Developmental Testing for down-selected contractor.<br>***FY 2020 Base Plans:***<br>- Complete DT&E Reliability Growth Testing (EMD)<br>- Complete Production Qualification Test/Reliability Qualification Testing (PQT/RQT) development testing execution.<br>- Complete LFT&E modeling and simulation for Full Up System Level (FUSL) Live Fire Testing.<br>- Initiate and complete Initial Operational Test and Evaluation (IOT&E)<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The decrease in Test & Evaluation between FY2019 and FY2020 ($5.337) is attributed to completion of Reliability Growth Testing (RGT), PQT/RQT, FUSL, and IOT&E in FY2020. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 150.381 | 42.448 | 23.299 | 0.000 | 23.299 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/2025: *Amphibious Combat Vehicle 1.1* | 156.693 | 167.478 | 317.935 | - | 317.935 | 493.300 | 0.000 | 0.000 | 0.000 | 0.000 | 1,135.406 |
| • PMC/7000/ACV 1.1: *Initial Spares - ACV 1.1* | 5.569 | 6.145 | 13.954 | - | 13.954 | 13.634 | 0.000 | 0.000 | 0.000 | 0.000 | 39.302 |
| • RDTE/0605611M/0026: *Amphibious Combat Vehicle 1.2* | 0.000 | 23.689 | 54.023 | - | 54.023 | 59.457 | 43.940 | 8.202 | 8.498 | Continuing | Continuing |
| • PMC/2026: *Amphibious Combat Vehicle 1.2* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 710.289 | 697.264 | 708.684 | Continuing | Continuing |
| • PMC/7000/ACV 1.2: *Initial Spares - ACV 1.2* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 19.337 | 19.763 | 20.158 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The program office awarded two competitive Engineering and Manufacturing Development (EMD) contracts to two vendors to build 16 vehicles each (32 total). ACV Increment 1.1 entered the acquisition cycle at Milestone B in FY 2016 and down-selected to one vendor at Milestone C in 3Q FY 2018; the program entered into Low Rate Initial Production (LRIP) at Milestone C. Full Rate Production (FRP) will begin in FY 2020. The contract includes competitively priced options for the development phase through Full Rate Production (FRP).

**E. Performance Metrics**

Milestone Reviews
Milestone B: 1QFY16
Milestone C: 3QFY18
FRP Decision: 3QFY20

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | Project (Number/Name)<br>0025 / *Amphibious Combat Vehicle 1.1* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Design &Development | C/FPIF | Various : Various | 0.000 | 96.301 | Jan 2018 | 13.844 | Jan 2019 | 1.764 | Jan 2020 | - | | 1.764 | 0.000 | 111.909 | - |
| Other Product Devolpment | C/FFP | SPAWAR : New Jersey/Charleston/ Picatinny | 0.000 | 8.429 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 8.429 | - |
| | | **Subtotal** | 0.000 | 104.730 | | 13.844 | | 1.764 | | - | | 1.764 | 0.000 | 120.338 | N/A |

**Remarks**

- The decrease in System Design & Development between FY 2019 & FY 2020 ($12.080) is attributed to the completion of the design and development phase of the program in FY2020.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | WR | Various : Various | 0.000 | 0.300 | Apr 2018 | 0.946 | Apr 2019 | 1.013 | Apr 2020 | - | | 1.013 | 0.000 | 2.259 | - |
| Technical Data & Pubs Development | WR | NSWC CD : Carderock, MD | 0.000 | 0.100 | Sep 2018 | 0.100 | Sep 2019 | 0.100 | Apr 2020 | - | | 0.100 | 0.000 | 0.300 | - |
| In-House Technical Support | WR | Various : Various | 0.000 | 7.807 | Apr 2018 | 3.445 | Apr 2019 | 1.066 | Apr 2020 | - | | 1.066 | 0.000 | 12.318 | - |
| Training Devices/ Simulators | WR | NAWC : Orlando, FL | 0.000 | 0.366 | Apr 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.366 | - |
| Travel | Various | Various : Various | 0.000 | 0.062 | Sep 2018 | 0.100 | Sep 2019 | 0.147 | Sep 2020 | - | | 0.147 | 0.000 | 0.309 | - |
| | | **Subtotal** | 0.000 | 8.635 | | 4.591 | | 2.326 | | - | | 2.326 | 0.000 | 15.552 | N/A |

**Remarks**

- The decrease in In-House Technical Support between FY2019 and FY2020 ($2.265) is attributed to the completion of Armor Life/Durability Characterization, decreased field service representatives, and spares support for communications suites and remote weapon stations.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Test & Evaluation | WR | Various : Various | 0.000 | 14.072 | Jan 2018 | 12.559 | Jan 2019 | 4.931 | Jan 2020 | - | | 4.931 | 0.000 | 31.562 | - |
| Operational Test & Evaluation | WR | MCOTEA : Quantico,VA | 0.000 | 6.041 | Jan 2018 | 1.849 | Jan 2019 | 9.104 | Jan 2020 | - | | 9.104 | 0.000 | 16.994 | - |
| Live Fire Test & Evaluation | WR | Various : Various | 0.000 | 2.885 | Jan 2018 | 7.605 | Jan 2019 | 2.641 | Jan 2020 | - | | 2.641 | 0.000 | 13.131 | - |
| | | **Subtotal** | 0.000 | 22.998 | | 22.013 | | 16.676 | | - | | 16.676 | 0.000 | 61.687 | N/A |

**Remarks**

- The decrease in Developmental Test & Evaluation between FY2019 & FY2020 ($7.628) is attributed to the completion of Reliability Growth Testing (RGT), Production Qualification Testing (PQT) and Reliability Qualification Testing (RQT) in FY2020.
- The increase in Operational Test & Evaluation between FY2019 and FY2020 ($7.255) is attributed to the initiation and completion of IOT&E.
- The decrease in Live Fire Test & Evaluation between FY2019 & FY2020 ($4.964) is primarily attributed to completion of the Full Up System Level (FUSL) Live Fire test event in FY2020.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering & Technical Services | Various | Various : Various | 0.000 | 5.357 | Mar 2018 | 0.911 | Mar 2019 | 0.356 | Mar 2020 | - | | 0.356 | 0.000 | 6.624 | - |
| Management Support Services | Various | Various : Various | 0.000 | 8.661 | Mar 2018 | 1.089 | Mar 2019 | 1.877 | Mar 2020 | - | | 1.877 | 0.000 | 11.627 | - |
| Studies and Analyses | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.300 | Apr 2020 | - | | 0.300 | 0.000 | 0.300 | - |
| | | **Subtotal** | 0.000 | 14.018 | | 2.000 | | 2.533 | | - | | 2.533 | 0.000 | 18.551 | N/A |

**Remarks**

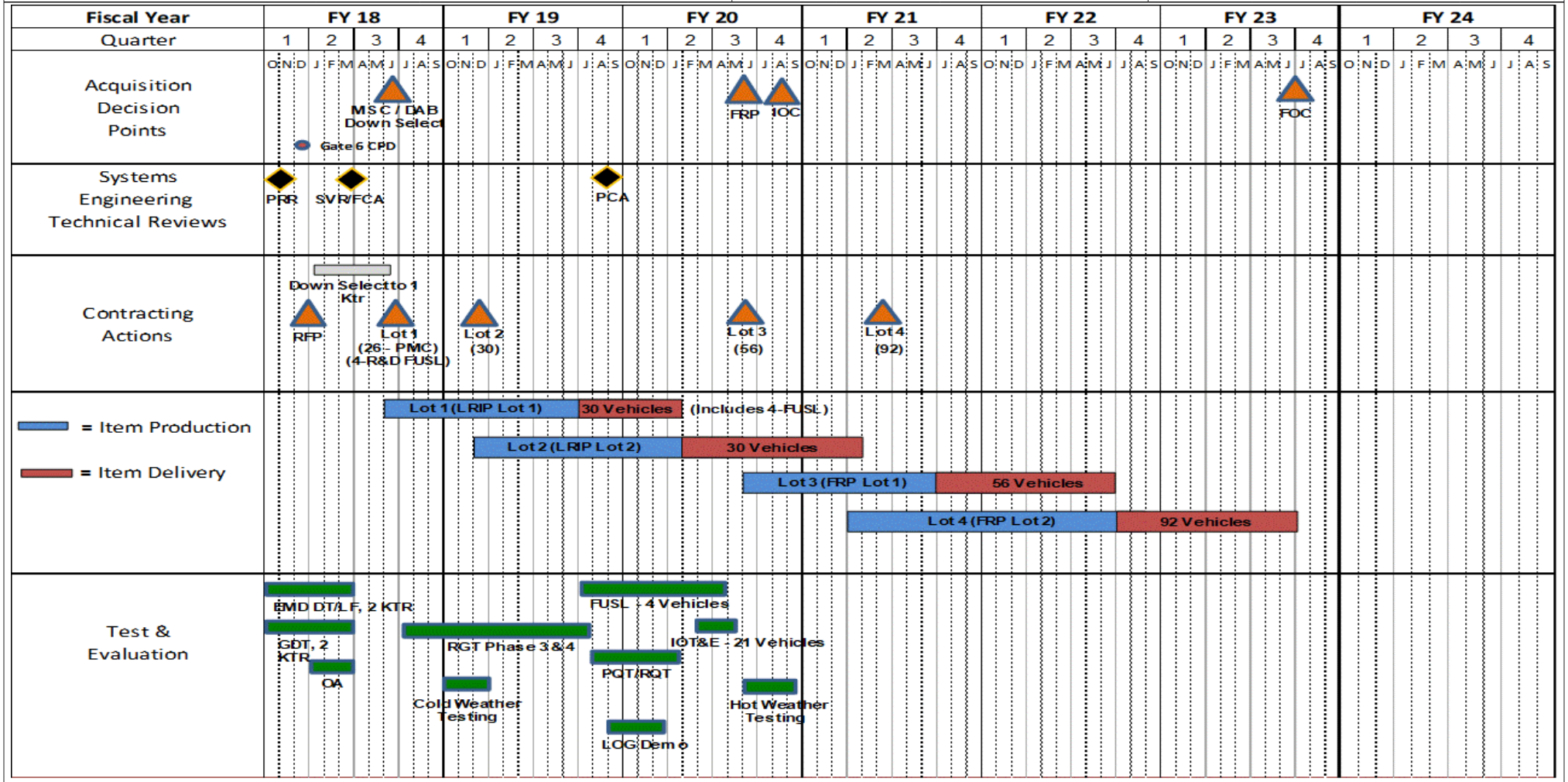
- The decrease in Engineering and Technical Services ($0.555) is attributed to completion of engineering services in support of the development program in FY2020.
- The increase in Management Services between FY2019 and FY2020 ($0.788) is attributed to continued business, acquisition, logistics and engineering related support during conduct of IOT&E in FY2020.
-The increase in Studies & Analyses between FY 2019 and FY 2020 ($0.300) is due to logistics-related analyses in support of system fielding.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | Project (Number/Name)<br>0025 / *Amphibious Combat Vehicle 1.1* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 150.381 | | 42.448 | | 23.299 | | - | | 23.299 | 0.000 | 216.128 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0025 / *Amphibious Combat Vehicle 1.1* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0025*** | | | | |
| Operational Assessment (OA) | 2 | 2018 | 2 | 2018 |
| MS C/DAB Down Select | 3 | 2018 | 3 | 2018 |
| LRIP Option 1 Exercised | 3 | 2018 | 3 | 2018 |
| LRIP Option 2 Exercised | 1 | 2019 | 1 | 2019 |
| Initial Operational Test & Evaluation (IOT&E) | 2 | 2020 | 3 | 2020 |
| Full Rate Production (FRP) Decision | 3 | 2020 | 3 | 2020 |
| FRP #1 Option Exercised | 3 | 2020 | 3 | 2020 |
| Initial Operational Capability (IOC) | 4 | 2020 | 4 | 2020 |
| FRP #2 Option Exercised | 2 | 2021 | 2 | 2021 |
| Full Operational Capability (FOC) | 4 | 2023 | 4 | 2023 |
| FUSL Test and Evaluation | 4 | 2019 | 3 | 2020 |
| RGT Phase 3/4 Test and Evaluation | 4 | 2018 | 4 | 2019 |
| PQT/RQT | 4 | 2019 | 2 | 2020 |
| Cold Weather Testing | 1 | 2019 | 1 | 2019 |
| Hot Weather Testing | 3 | 2020 | 4 | 2020 |
| Logistic Demo | 4 | 2019 | 1 | 2020 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | Project (Number/Name)<br>0026 / *Amphibious Combat Vehicle 1.2* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0026: *Amphibious Combat Vehicle 1.2* | 0.000 | 0.000 | 23.689 | 54.023 | - | 54.023 | 59.457 | 43.940 | 8.202 | 8.498 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The Amphibious Combat Vehicle (ACV) will be a partial and complementary replacement for the legacy Amphibious Assault Vehicle (AAV) battalion's within the Marine Divisions. ACV-equipped AA companies will provide protected mobility and general support lift to elements of Marine Infantry Battalions. The ACV, an advanced generation, eight-wheeled armored personnel carrier, will mitigate current and projected capability gaps by providing improved lethality against dismounted enemy troops, more effective land and water tactical mobility, and increased force protection and survivability from blast, fragmentation, and kinetic energy threats. The ACV program is structured to be executed in multiple increments, with the first increment designed to provide an initial operational capability of personnel carriers. Subsequent increments are planned to provide additional personnel variants and to develop Mission Role Variants (MRVs), such as command and control and tactical recovery capabilities. ACV 1.2 will provide the Marine Corps with armored protected land mobility to effectively maneuver with the rest of the armored Marine Air Ground Task Force (MAGTF) and the water mobility to self-deploy from amphibious shipping.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product Developmemt | 0.000 | 23.144 | 50.375 | 0.000 | 50.375 |
| ***Articles:*** | - | - | 3 | - | 3 |
| ***Description:*** System Design and Development; Engineering and Manufacturing Development (EMD) test vehicle manufacturing; prime contractor Developmental and Operational test support, and development of Logistics Management Information (LMI) data. | | | | | |
| ***FY 2019 Plans:***<br>- Initiate design and development of two of three ACV Mission Role Variants: Command Variant (ACV-C) and Gun Variant (ACV-30).<br>- Initiate software development for CROWS-II Multi-User/Multi-Station (MUMS) and CROWS-II Embedded Trainer (ET) capabilities. | | | | | |
| ***FY 2020 Base Plans:***<br>- Continue ACV MRV design and development activities for ACV-C and ACV-30.<br>- Initiate design and development activities for the Recovery Variant, ACV-R.<br>- Initiate test article procurement for three (3) ACV-C command variants and associated Government Furnished Equipment (GFE). | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0026 / *Amphibious Combat Vehicle 1.2* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| - Initiate Vehicle Protective System (VPS) trade study and integration efforts.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase in Product Development from FY2019 to FY2020 ($27.231) is attributed to procurement of three ACV MRV test articles, associated GFE, and initiation of VPS trade study and integration efforts. | | | | | |
| ***Title:*** Program Support<br>***Articles:***<br>***Description:*** Government Labor, material, and travel for Integrated Logistics Support, Technical Publications, Support Equipment development, In-house Technical Support, and Program Management support.<br>***FY 2019 Plans:***<br>- Initiate and complete technical support for Armor Characterization efforts.<br>- Initiate development of technical data and publications.<br>***FY 2020 Base Plans:***<br>- Initiate operator and maintainer training devices and simulators design and development (e.g., Gunnery Trainer and Maintenance Task Trainer (MTT)), which are required in advance of system fielding in order to provide this capability to the OpFor for their use of this new vehicle.<br>- Continue development of technical data and publications for ACV Command and Gun variants; initiate development of technical data and publications for ACV Recovery variant.<br>- Initiate support for procurement, inventory, and shipping of GFE.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The increase in Program Support from FY2019 to FY2020 ($3.103M) is attributed to support for technical data and publications development, initiation of required training devices and simulators design and development, and GFE support. | 0.000<br>- | 0.545<br>- | 3.648<br>- | 0.000<br>- | 3.648<br>- |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 23.689 | 54.023 | 0.000 | 54.023 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0026 / *Amphibious Combat Vehicle 1.2* | |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/2025: *Amphibious Combat Vehicle 1.1* | 156.693 | 167.478 | 317.935 | - | 317.935 | 493.300 | 0.000 | 0.000 | 0.000 | 0.000 | 1,135.406 |
| • PMC/2025/7000: *Initial Spares ACV 1.1* | 5.569 | 6.145 | 13.954 | - | 13.954 | 13.634 | 0.000 | 0.000 | 0.000 | 0.000 | 39.302 |
| • RDTE/0025: *Amphibious Combat Vehicle 1.1* | 150.381 | 42.448 | 23.299 | - | 23.299 | 0.060 | 0.000 | 0.000 | 0.000 | 0.000 | 216.188 |
| • PMC/2026: *Amphibious Combat Vehicle 1.2* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 710.289 | 697.264 | 708.684 | 0.000 | 2,116.237 |
| • PMC/2026/7000: *Initial Spares ACV 1.2* | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 19.337 | 19.763 | 20.158 | 0.000 | 59.258 |

**Remarks**

**D. Acquisition Strategy**

The ACV Program Increment 1.2 will deliver additional ACV 1.1 Personnel Variants (currently in production); and Command and Control (ACV-C), Recovery (ACV-R), and 30-mm (ACV-30) Mission Role Variants (MRV). The development acquisition approach for ACV 1.2 MRVs will be streamlined by modifying baseline ACV 1.1 Personnel Vehicles to the MRV configurations. This strategy maximizes use of the ACV 1.1 design currently in production, and provides for integration of the latest standard government furnished communications, weapons, and sensors. This approach will minimize program cost, schedule, and performance risk, minimize development costs, and provide rapid fielding of current capabilities to meet operational requirements.

**E. Performance Metrics**

ACV-C ECP Approval: 3QFY20
ACV-30 ECP Approval: 3QFY21
ACV-R ECP Approval: 3QFY22

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | Project (Number/Name)<br>0026 / *Amphibious Combat Vehicle 1.2* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Design & Development | C/FPIF | BAE : York PA | 0.000 | 0.000 | | 23.144 | Mar 2019 | 41.701 | Dec 2019 | - | | 41.701 | Continuing | Continuing | Continuing |
| Other Product Development | WR | SPAWAR : Charleston SC | 0.000 | 0.000 | | 0.000 | | 8.674 | Dec 2019 | - | | 8.674 | 0.000 | 8.674 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 23.144 | | 50.375 | | - | | 50.375 | Continuing | Continuing | N/A |

**Remarks**

The increase in system design and development between FY2019 and FY2020 ($18.557) is attributed to continued MRV design activities, and procurement of three (3) MRV test articles. The increase in other product development between FY2019 and FY2020 ($8.674) is attributed to procurement of GFE communications suites for test articles and initiation of vehicle protection system design and development in FY2020.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integrated Logistics Support | C/BA | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Training Decives/ Simulators | TBD | TACOM : Warren MI | 0.000 | 0.000 | | 0.000 | | 2.201 | Apr 2020 | - | | 2.201 | Continuing | Continuing | Continuing |
| Technical Data & Pubs Development | TBD | TBD : TBD | 0.000 | 0.000 | | 0.213 | Jan 2019 | 0.613 | Jan 2020 | - | | 0.613 | Continuing | Continuing | Continuing |
| In-House Technical Support | Various | Various : Various | 0.000 | 0.000 | | 0.245 | May 2019 | 0.745 | May 2020 | - | | 0.745 | Continuing | Continuing | Continuing |
| Travel | Various | Various : Various | 0.000 | 0.000 | | 0.087 | Sep 2019 | 0.089 | Sep 2020 | - | | 0.089 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.545 | | 3.648 | | - | | 3.648 | Continuing | Continuing | N/A |

**Remarks**

The increase in training devices and simulators between FY2019 and FY2020 ($2.201) reflects initiation of operator and maintainer training systems which are required in advance of system fielding in order to provide this capability to the OpFor for their use of this new vehicle. The increase in pubs and tech data ($0.400) reflects the normal progression in the continuation of technical data development required to operate and maintain the new vehicle. The increase in In-House Technical Support ($0.500) between FY2019 and FY2020 is attributed to support required for GFE management.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0026 / *Amphibious Combat Vehicle 1.2* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Operational Test & Evaluation | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Live Fire Test & Evaluation (LFT&E) | WR | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

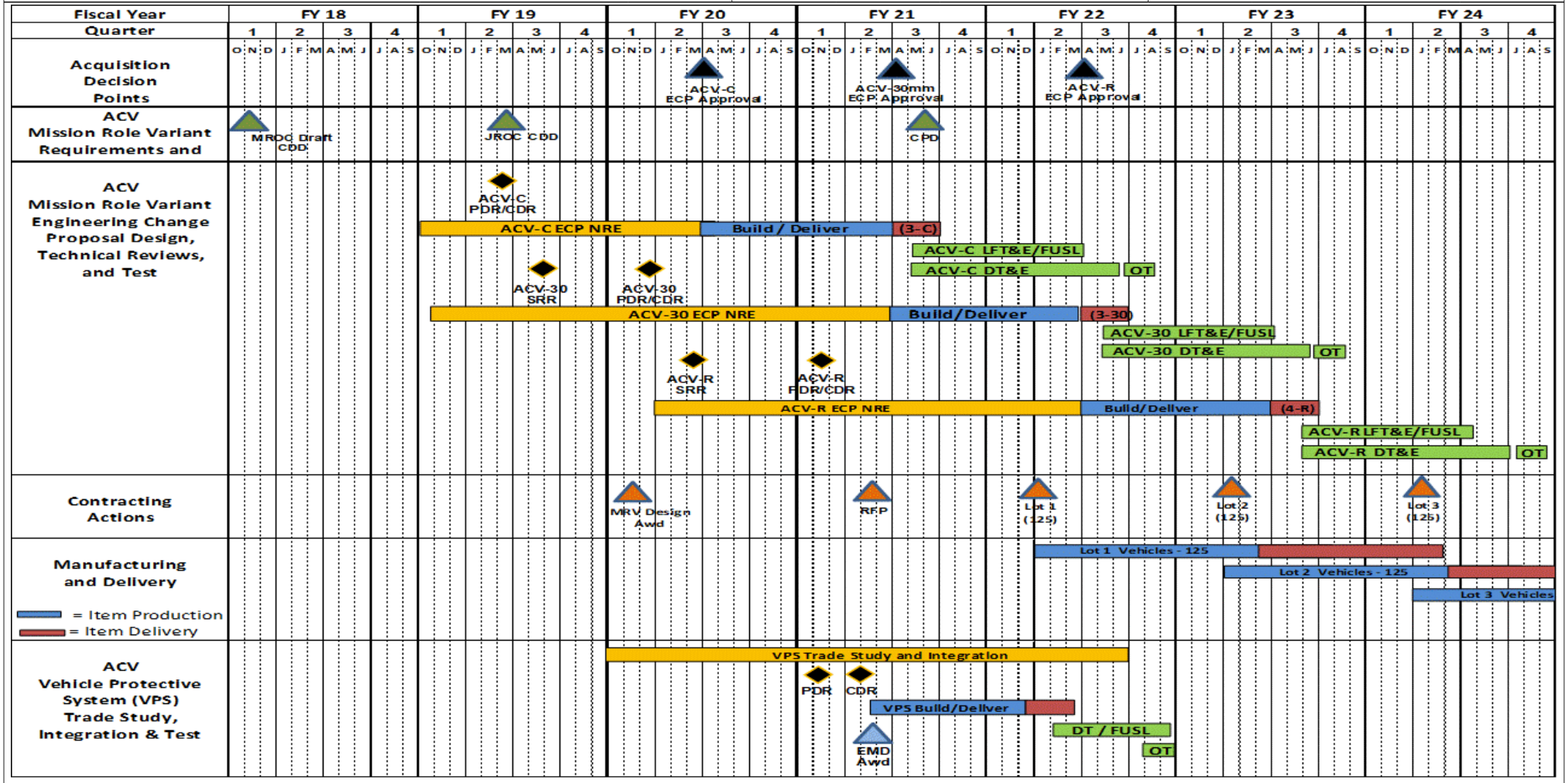
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Engineering and Technical Services | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Management Support Services | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Studies and Analysis | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 23.689 | | 54.023 | | - | | 54.023 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0026 / *Amphibious Combat Vehicle 1.2* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605611M / *(U) MC AVS Development & Demonstration* | **Project (Number/Name)**<br>0026 / *Amphibious Combat Vehicle 1.2* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 0026*** | | | | |
| PDR/CDR (ACV-C) | 2 | 2019 | 2 | 2019 |
| MRV Design Award | 1 | 2020 | 1 | 2020 |
| PDR/CDR (ACV-30) | 1 | 2020 | 1 | 2020 |
| ECP Approval (ACV-C) | 3 | 2020 | 3 | 2020 |
| PDR/CDR (ACV-R) | 1 | 2021 | 1 | 2021 |
| ECP Approval (ACV-30) | 3 | 2021 | 3 | 2021 |
| DT, LFT&E, OT (ACV-C) | 3 | 2021 | 4 | 2022 |
| Lot 1 Contract Award | 2 | 2022 | 2 | 2022 |
| ECP Approval (ACV-R) | 3 | 2022 | 3 | 2022 |
| DT, LFT&E, OT (ACV-30) | 3 | 2022 | 4 | 2023 |
| Lot 2 Contract Award | 2 | 2023 | 2 | 2023 |
| DT, LFT&E, OT (ACV-R) | 3 | 2023 | 4 | 2024 |
| Lot 3 Contract Award | 2 | 2024 | 2 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | | Date: March 2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0605813M *I (U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 0.000 | 19.467 | 0.000 | 2.105 | - | 2.105 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.572 |
| 3209: *Joint Light Tactical Vehicle* | 0.000 | 19.467 | 0.000 | 2.105 | - | 2.105 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.572 |
| **Program MDAP/MAIS Code:**<br>**Project MDAP/MAIS Code(s):** 279 | | | | | | | | | | | | |

**Note**

The FY 2011 NDAA directed the Services to separate the Joint Light Tactical Vehicle (JLTV) program into distinct PEs to provide Congress with increased transparency and allow for more effective oversight. Transition of funding from PE 0603635M to PE 0605812M was effective beginning in FY 2013.

Beginning in FY18, program funding transitioned from Budget Activity 4, Program Element 0605812M Joint Light Tactical Vehicle (JLTV) EMD to account for program progression through the acquisition process.

**A. Mission Description and Budget Item Justification**

Funding supports the JLTV Family of Vehicles (FoV) to include the development and testing of Command, Control, Communications, Computers, & Intelligence (C4I) for integration with the JLTV. JLTV is a joint program between the U.S. Army and the U.S. Marine Corps, of which the U.S. Army is the lead service. JLTV is a FoV capable of performing multiple mission roles designed to provide protected, sustained, and networked mobility for personnel and payloads across the full Range of Military Operations (ROMO). JLTV features include increased performance, protection, and payload over the current legacy High Mobility Multipurpose Wheeled Vehicle (HMMWV) fleet, minimizing ownership costs by maximizing commonality, fuel efficiency and reliability. The commonality of components, maintenance procedures, training, etc, among vehicles are inherent in FoV solutions across mission variants to minimize total ownership cost. Unique service requirements have been minimized.

Major FY20 budget activities include systems engineering/integration activities, design analysis and tests conducted at the Joint GSIL. Efforts will focus on enhancing performance of Command, Control, Communications, Computers and Intelligence Surveillance and Reconnaissance (C4ISR) system capabilities as they relate to the JLTV; developmental efforts required for the integration of future C4ISR requirements on the JLTV; and cyber security vulnerability assessment and development of associated solutions of the JLTV system and integrated GFE and software. Future C4ISR integration activities such as: Network on the Move (NOTOM) Ground Combat Vehicles; Mounted Family of Computers Core Services (MFoCS); Communications Emitter Sensing and Attack Systems (CESAS); and Military GPS User Equipment (MGUE).

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0605813M *I (U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* |

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 20.710 | 2.260 | 2.122 | - | 2.122 |
| Current President's Budget | 19.467 | 0.000 | 2.105 | - | 2.105 |
| Total Adjustments | -1.243 | -2.260 | -0.017 | - | -0.017 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -2.260 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.453 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.790 | 0.000 | | | |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.017 | - | -0.017 |

**Change Summary Explanation**

The funding increase from FY 2019 to FY 2020 of $2.105M is required for Government Systems Integration Laboratory (GSIL) systems engineering, design analysis and integration efforts for the JLTV and reflects the Congressional Directed Reduction of FY 2019 funding.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | Project (Number/Name)<br>3209 / *Joint Light Tactical Vehicle* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3209: *Joint Light Tactical Vehicle* | 0.000 | 19.467 | 0.000 | 2.105 | - | 2.105 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 21.572 |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 279

**Note**

Beginning in FY18, program funding transitioned from Budget Activity 4 Program Element 0605812M Joint Light Tactical Vehicle (JLTV) EMD to account for advancement through the acquisition process.

The funding increase from FY 2019 to FY 2020 of $2.105M is required for Government Systems Integration Laboratory (GSIL) systems engineering, design analysis and integration efforts for the JLTV.

**A. Mission Description and Budget Item Justification**

Funding supports the JLTV Family of Vehicles (FoV) to include the development and testing of Command, Control, Communications, Computers, & Intelligence (C4I) for integration with the JLTV. JLTV is a joint program between the U.S. Army and the U.S. Marine Corps, of which the U.S. Army is the lead service. JLTV is a FoV capable of performing multiple mission roles designed to provide protected, sustained, and networked mobility for personnel and payloads across the full Range of Military Operations (ROMO). JLTV features include increased performance, protection, and payload over the current legacy HMMWV fleet, minimizing ownership costs by maximizing commonality, fuel efficiency and reliability. The commonality of components, maintenance procedures, training, etc, among vehicles are inherent in FoV solutions across mission variants to minimize total ownership cost. Unique service requirements have been minimized.

Funding supports modernization of the current JLTV by investigating technology insertions including, but not limited to: condition based maintenance, vetronics, Victory Architecture, autonomous operations and other emerging technologies.

Major FY20 budget activities include systems engineering/integration activities, design analysis and tests conducted at the Joint GSIL. Efforts will focus on enhancing performance of Command, Control, Communications, Computers and Intelligence Surveillance and Reconnaissance (C4ISR) system capabilities as they relate to the JLTV; developmental efforts required for the integration of future C4ISR requirements on the JLTV; and cyber security vulnerability assessment and development of associated solutions of the JLTV system and integrated GFE and software. Future C4ISR integration activities include efforts such as: Network on the Move (NOTOM) Ground Combat Vehicles; Mounted Family of Computers Core Services (MFoCS); Communications Emitter Sensing and Attack Systems (CESAS); and Military GPS User Equipment (MGUE).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Government Systems Integration Laboratory (GSIL) Analysis and Support Engineering | 2.239 | 0.000 | 2.105 | 0.000 | 2.105 |
| ***Articles:*** | - | - | - | - | - |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Systems analysis and integration activity at the GSIL will assess the JLTV requirements associated with power, weight and space for upgraded legacy C4I systems as well as the introduction of future capabilities such as Mounted Family of Computers (MFOCs), Network on the Move (NOTM), Communications Emitter Sensing and Attack Systems (CESAS), Military GPS User Equipment, and other radio communication platforms.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>NOTE: The funding increase of $2.105M from FY 2019 to FY 2020 provides for the continuation of systems analysis and integration activity as well as the exploration of future capabilities such as Mounted Family of Computers (MFOCs), Network on the Move (NOTM), Communications Emitter Sensing and Attack Systems (CESAS), Military GPS User Equipment, and other radio communication platforms. | | | | | |
| ***Title:*** Test and Evaluation Events and Analysis | 15.812 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| ***Title:*** Program Management Support | 1.416 | 0.000 | 0.000 | 0.000 | 0.000 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2020 OCO Plans:***<br>N/A | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 19.467 | 0.000 | 2.105 | 0.000 | 2.105 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • PMC/5095: *Joint Light Tactical Vehicle (JLTV)* | 233.439 | 599.274 | 558.107 | - | 558.107 | 484.337 | 441.728 | 423.591 | 432.023 | 627.564 | 3,970.296 |
| • OPA/D15603: *JLTV (Army)* | 810.050 | 1,279.437 | 996.007 | - | 996.007 | 1,096.958 | 1,096.862 | 1,096.787 | 1,096.571 | 12,204.788 | 20,670.601 |
| • RDT&E/VU9: *0605812A - JLTV (Army)* | 16.853 | 0.000 | 2.732 | - | 2.732 | 1.744 | 1.801 | 1.835 | 2.010 | 31.224 | 529.737 |

**Remarks**

**D. Acquisition Strategy**

Joint Light Tactical Vehicle (JLTV) is a Joint Service Program with the U.S. Army and U.S. Marine Corps as the two main components. The U.S. Army is the JLTV service lead.

The JLTV Program entered the Production and Deployment Phase with the Acquisition Decision Memorandum authorization on 25 August 2015. With Milestone C approval, the LRIP fixed price contract was awarded to Oshkosh Defense LLC on 25 August 2015. This contract consists of a three year LRIP period with options for five additional years of Full Rate procurement (FRP) deliveries. JPO JLTV requested separately priced firm fixed price (FFP) option(s) for purchase of the Technical Data Package (TDP) with appropriate data rights to allow for possible future competition for production vehicles and spares.

The JLTV program will continually monitor emerging technologies and capabilities through its partnerships with U.S. Army and Marine Corps science and technology organizations as well as through industry market research and partnerships. The JLTV program will look for opportunities to implement increased capabilities throughout the systems' life cycle.

**E. Performance Metrics**

Full Rate Production Decision (FRP) May 2019

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | Project (Number/Name)<br>3209 / *Joint Light Tactical Vehicle* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Integration-GSIL | MIPR | SPAWAR Atlantic : Charleston, SC | 0.000 | 2.239 | Feb 2018 | 0.000 | | 2.105 | Feb 2020 | - | | 2.105 | 0.000 | 4.344 | Continuing |
| | | **Subtotal** | 0.000 | 2.239 | | 0.000 | | 2.105 | | - | | 2.105 | 0.000 | 4.344 | N/A |

**Remarks**

FY2017 and prior year details provided in PE 0605812M/Project 3209

FY2020 supports systems engineering/integration activities, design analysis and tests conducted at the Joint GSIL. Efforts will focus on enhancing performance of Command, Control, Communications, Computers and Intelligence Surveillance and Reconnaissance (C4ISR).

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Multi-Service Operational Test and Evaluation (MOT&E) & follow-on testing | MIPR | Government Proving Grounds-Various : Various | 0.000 | 11.407 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.407 | - |
| Developmental Test and Evaluation Oversight | MIPR | MCOTEA : Quantico, VA | 0.000 | 0.203 | Jan 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.203 | - |
| R&D system integration test vehicles/kits | C/FFP | Oshkosh : Oshkosh, WC | 0.000 | 4.202 | Nov 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 4.202 | - |
| | | **Subtotal** | 0.000 | 15.812 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.812 | N/A |

**Remarks**

FY17 and prior year details provided in PE 0605812M/Project 3209

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | C/CPFF | Various : Various | 0.000 | 0.211 | Feb 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.211 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | Project (Number/Name)<br>3209 / *Joint Light Tactical Vehicle* | |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Various | MCSC : Quantico, VA | 0.000 | 1.205 | Oct 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.205 | - |
| | | **Subtotal** | 0.000 | 1.416 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.416 | N/A |

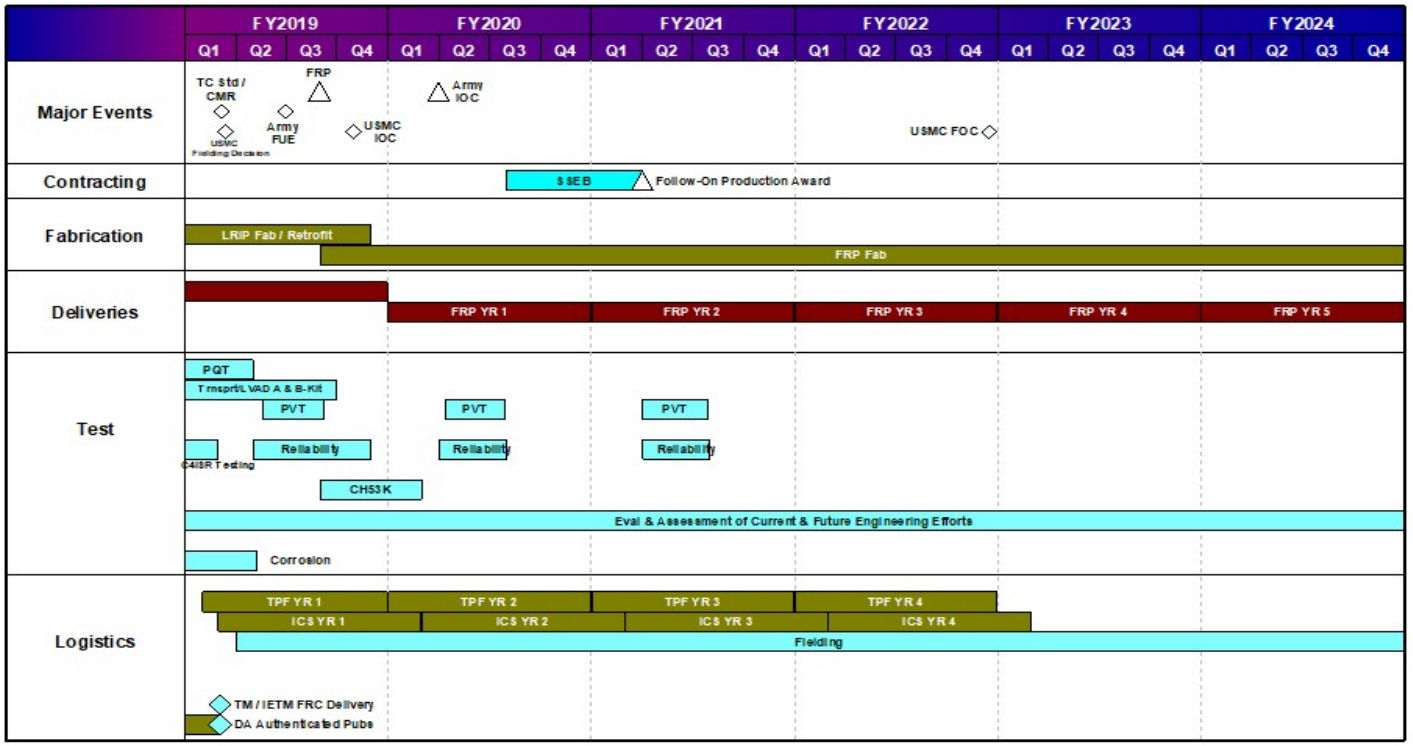
**Remarks**

FY17 and prior year details provided in PE 0605812M/Project 3209

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 19.467 | | 0.000 | | 2.105 | | - | | 2.105 | 0.000 | 21.572 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |




ICS – Interim Contractor Support
PVT – Product Verification Testing
TPF – Total Package Fielding

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0605813M / *(U)Joint Light Tactical Veh (JLTV) Sys Dev & Dem* | **Project (Number/Name)**<br>3209 / *Joint Light Tactical Vehicle* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3209*** | | | | |
| USMC Fielding Decision | 1 | 2019 | 1 | 2019 |
| Full Rate Production Decision | 3 | 2019 | 3 | 2019 |
| USMC Initial Operational Capability | 4 | 2019 | 4 | 2019 |
| USMC Full Operational Capability | 4 | 2022 | 4 | 2022 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0204202N / *DDG-1000* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 1,429.462 | 134.664 | 140.264 | 111.435 | - | 111.435 | 107.912 | 72.025 | 15.042 | 10.164 | Continuing | Continuing |
| 2464: *DD(X) Sys Design, Dev & Integration* | 1,429.462 | 134.664 | 140.264 | 111.435 | - | 111.435 | 107.912 | 72.025 | 15.042 | 10.164 | Continuing | Continuing |

**Program MDAP/MAIS Code:**
**Project MDAP/MAIS Code(s):** 197

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was reduced by $5.000 million to account for the availability of prior year execution balances.

This Program Element (PE) provides funds for development of the DDG 1000 Class of U.S. Navy surface combatants. The mission of the DDG 1000 class is to provide credible independent forward presence/deterrence and operate as an integral part of Naval, Joint or Combined Maritime Forces. DDG 1000 will establish and maintain surface and sub-surface superiority, provide local air defense, and incorporate signature reduction to operate in all threat environments. DDG 1000 will have seamless Joint Interoperability to integrate all source information for battlespace awareness and weapons direction.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 140.500 | 161.264 | 132.337 | - | 132.337 |
| Current President's Budget | 134.664 | 140.264 | 111.435 | - | 111.435 |
| Total Adjustments | -5.836 | -21.000 | -20.902 | - | -20.902 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -21.000 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -1.512 | 0.000 | | | |
| • SBIR/STTR Transfer | -4.324 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -21.059 | - | -21.059 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 0.157 | - | 0.157 |

**Change Summary Explanation**

FY18: Reduction due to SBIR and reprogramming action to support the AMDR Mission Flight retest.
FY19: Reduction of $21.000M is due to the Lack of Acquisition and Test Strategies for MTC-A
FY20: The FY20 funding request was reduced by $5.000M to account for the availability of prior year execution balances, $15.000M of MTC-A rephased for executability, $1.059M for Contractor Services Reform reduction, and misc rate adjustments.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0204202N / *DDG-1000* | Project (Number/Name)<br>2464 / *DD(X) Sys Design, Dev & Integration* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2464: *DD(X) Sys Design, Dev & Integration* | 1,429.462 | 134.664 | 140.264 | 111.435 | - | 111.435 | 107.912 | 72.025 | 15.042 | 10.164 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Project MDAP/MAIS Code:** 197

**A. Mission Description and Budget Item Justification**

This project encompasses DDG 1000 development efforts required to deliver the Flight I DDG 1000 Class Ships. Major efforts include software requirements analysis, architectural and design code and unit testing, integration, qualification testing, and Independent Verification and Validation (IV&V) for Software Releases; execution of Integrated Power Systems (IPS) and ship control system testing and integration; Live Fire Test and Evaluation (LFT&E), Developmental Testing (DT), and Integrated Testing (IT) in support of the Test and Evaluation Master Plan (TEMP) and development of Tactical Tomahawk Weapon Control System (TTWCS) software. Funding for previous years is included in PE 0604300N and under 0204202N Project Unit 4009, Advanced Gun System (AGS), on DD(X).

Surface Strike
After a comprehensive review of Zumwalt class requirements, Navy decided in November 2017 to refocus the primary mission of the Zumwalt Class Destroyers from Land Attack to Offensive Surface Strike. The funding requested in PB 19 will facilitate this change in mission and add lethal, offensive fires against targets afloat and ashore. These changes include integration of SM-6 capability, Maritime Strike Tomahawk Integration, and organic cryptologic collection equipment (SPECTRAL). In order to maintain the required radar signature, an upgrade in off-board platform communications to the Network Tactical Common Data Link (NTCDL) is also required, paired with the SPECTRAL system.

The Advanced Gun Systems will remain on the ships, but in an inactive status for future use, when a gun round that can affordably meet the desired capability is developed and fielded.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Product / Software Development | 66.344 | 62.154 | 63.915 | 0.000 | 63.915 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Product Development/Software Development | | | | | |
| ***FY 2019 Plans:***<br>Enable the integration, lifecycle management and sustainment of the Total Ship Computing Environment (TSCE) Program of Record software as well as the capability to certify software at the Land Attack System Integration Lab (LASIL). Start development of the Surface Strike and Maritime Targeting Cell - Afloat (MTC-A). | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0204202N / *DDG-1000* | **Project (Number/Name)**<br>2464 / *DD(X) Sys Design, Dev & Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue development of the Surface Strike with Critical Design Review (CDR), Software (S/W) development, testing, and roll-out, preparing for Land Based Testing for SM-6. Preliminary Design Review (PDR)/Critical Design Review (CDR), Prepping for Final Qualifications Trail (FQT)for Maritime Strike Tomahawk (MST). Development of a low Radar Cross Section (RCS) antenna for use with SPECTRAL to include requirements definition, CDR, PDR and preparation for testing and installation of the sensor for SPECTRAL. Array placement and integration efforts and procurement of initial LRIP unit for Navy Tactical Common Data Link (NTCDL) and Maritime Targeting Cell - Afloat (MTC-A) with a Phase 1 IPR, a RFP Release, and a software delivery.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>Increase is due to the rephasing of MTC-A requirements into FY20 and follow. | | | | | |
| ***Title:*** Test and Evaluation | 68.320 | 78.110 | 47.520 | 0.000 | 47.520 |
| ***Articles:*** | - | - | - | - | - |
| ***Description:*** Test and Evaluation Master Plan (TEMP) Execution<br>***FY 2019 Plans:***<br>Continued planning and execution of Post Delivery Test and Trials TEMP events to include: Survivability, Aviation Facilities certification, Boat Handling System certification, Fueling at Sea certification, Self Defense Test Ship (SDTS) Anti-Air Warfare (AAW), Infrared, Acoustic and Magnetic Signature events, PRA Test Bed modeling and simulation Pre-Flight Runs for lead Ship AAW events, equipment shock qualification, pre-requisite test events for Lead Ship Anti-Air Warfare (AAW) testing, Performance and Special Trials to include Calm Water and Rough Water trials, planning for Lead ship Combat System Ship Qualification Trials (CSSQT), AAW testing, sonar and torpedo defense testing, and Anti-Surface warfare (ASuW) testing.<br>***FY 2020 Base Plans:***<br>Execution of TEMP events for AAW, ASuW, IUSW (ASW and Torpedo Defense), execution of leadship CSSQT events, completion of equipment shock qualification, planning for capability improvement, and testing IAW the CNO directed mission change to Offensive Surface Strike..<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0204202N / *DDG-1000* | **Project (Number/Name)**<br>2464 / *DD(X) Sys Design, Dev & Integration* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| The decrease of $30.590M is due to the completion of Equipment Shock Qualification, and the deferral of TEMP events to after completion of the Lead Ship Post Shakedown Availability (PSA). | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 134.664 | 140.264 | 111.435 | 0.000 | 111.435 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OMN / 3B1K: *Specialized Skill Training* | 2.971 | 3.024 | 3.070 | - | 3.070 | 3.129 | 3.191 | 3.246 | 3.311 | 0.000 | 728.636 |
| • OPN / 0947: *DDG 1000 Class Support Equipment* | 0.000 | 57.700 | 9.930 | - | 9.930 | 14.791 | 24.516 | 21.635 | 22.067 | 0.000 | 184.043 |
| • OMN/15BUO: *Life Cycle Engineering (IWS))* | 18.804 | 65.356 | 53.411 | - | 53.411 | 40.354 | 36.571 | 42.851 | 43.708 | 0.000 | 318.507 |
| • OMN/15BR1: *DDG 1000 Life Cycle Engineering and Sustainment* | 9.825 | 12.026 | 8.368 | - | 8.368 | 12.302 | 11.429 | 11.531 | 11.761 | 0.000 | 112.225 |
| • RDTEN/0603795N_2020: *Advanced Gun System Projectile* | 2.884 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.884 |
| • SCN/2119: *DDG 1000* | 216.968 | 270.965 | 155.944 | - | 155.944 | 50.400 | 2.100 | 0.000 | 0.000 | 0.000 | 13,195.453 |

**Remarks**

**D. Acquisition Strategy**

In October 2010 a revised acquisition strategy had been determined that supports the DDG-1000/DDG-51 restart shipyard allocation workload Memorandum of Agreements (MOAs). Execution of the MOAs shifted primary construction of all three DDG-1000 class ships to Bath Iron Works (BIW). Award of the DDG 1001/1002 to BIW occurred in September 2011.

**E. Performance Metrics**

Successfully complete Operational Test Readiness Review. Successfully complete Developmental Test/Integrated Test/Live Fire/Operational Test. Successfully achieve Initial Operational Capability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0204202N / *DDG-1000* | **Project (Number/Name)**<br>2464 / *DD(X) Sys Design, Dev & Integration* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ship Integration Development Software | SS/CPAF | Raytheon : Tewksbury MA | 911.935 | 48.456 | Dec 2017 | 30.387 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 990.778 | - |
| Ship Integration Development (Prod Dev), TTWCS /ASIST | SS/CPFF | Various : Various | 78.281 | 16.576 | Dec 2017 | 13.467 | Dec 2018 | 0.000 | | - | | 0.000 | 0.000 | 108.324 | - |
| Surface Strike Implementation | Various | Various : Various | 0.000 | 0.000 | | 8.300 | Jan 2019 | 33.970 | Dec 2019 | - | | 33.970 | Continuing | Continuing | Continuing |
| Maritime Targeting Cell - Afloat | Various | Various : Various | 0.000 | 0.000 | | 10.000 | Jan 2019 | 29.945 | Jan 2020 | - | | 29.945 | Continuing | Continuing | Continuing |
| Alternative Weapon System Analysis | Various | Various : Various | 0.000 | 1.312 | Jun 2018 | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 1.312 | - |
| | | **Subtotal** | 990.216 | 66.344 | | 62.154 | | 63.915 | | - | | 63.915 | Continuing | Continuing | N/A |

**Remarks**

Industry Day for surface strike and MTC-A was conducted in August 2018. This effort is in preparation of RFP release for development efforts beginning in FY19.

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDTS (ITB1-120) / PRA TB | SS/CPFF | Raytheon : Portsmouth, RI | 120.799 | 6.500 | Dec 2017 | 11.300 | Dec 2018 | 8.438 | Dec 2019 | - | | 8.438 | 4.800 | 151.837 | - |
| T&E Engineering | C/CPIF | CSC : Washington, DC | 3.200 | 0.200 | Dec 2017 | 0.200 | Dec 2018 | 0.200 | Dec 2019 | - | | 0.200 | 0.200 | 4.000 | - |
| SDTS/PRA/Integrated Test | Various | Various : Various | 43.064 | 6.078 | Nov 2017 | 2.116 | Nov 2018 | 4.018 | Nov 2019 | - | | 4.018 | 5.411 | 60.687 | - |
| Advanced Program | C/CPIF | NSMA : Arlington, VA | 12.179 | 4.400 | Nov 2017 | 2.400 | Nov 2018 | 3.853 | Feb 2020 | - | | 3.853 | 2.400 | 25.232 | - |
| Maritime Targeting Cell - Afloat | TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| Eng/M&S/Cert Agents | WR | NSWC : Dahlgren, VA | 8.127 | 0.200 | Nov 2017 | 0.244 | Nov 2018 | 0.412 | Nov 2019 | - | | 0.412 | 0.200 | 9.183 | - |
| Integrated Test | WR | NSWC : Bethesda, MD | 15.333 | 1.614 | Nov 2017 | 2.450 | Nov 2018 | 2.169 | Nov 2019 | - | | 2.169 | 1.825 | 23.391 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0204202N / *DDG-1000* | **Project (Number/Name)**<br>2464 / *DD(X) Sys Design, Dev & Integration* |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HM&E Systems | WR | NSWC : Philadelphia, PA | 0.600 | 0.250 | Nov 2017 | 0.000 | | 0.000 | | - | | 0.000 | 0.125 | 0.975 | - |
| SDTS/PRA/Test Bed/ ESSM Engagement | Various | Various : Various | 11.264 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 11.264 | - |
| Threat Assesment/IR | C/CPIF | NRL : Washington, DC | 0.000 | 1.400 | Dec 2017 | 1.320 | Dec 2018 | 0.525 | Dec 2019 | - | | 0.525 | 1.800 | 5.045 | - |
| SDTS | WR | SCSC : Wallops, Is, VA | 5.903 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 5.903 | - |
| LFT&E | C/CPIF | ROI : Mullica Hills, NJ | 7.950 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 7.950 | - |
| ITB3/ITB4/OPEVAL | Various | Various : Various | 0.000 | 16.092 | Nov 2017 | 12.983 | Nov 2018 | 10.536 | Nov 2019 | - | | 10.536 | 14.800 | 54.411 | - |
| Integration and Testing | Various | Various : Various | 11.930 | 0.023 | Dec 2017 | 0.599 | Dec 2018 | 0.000 | | - | | 0.000 | 0.024 | 12.576 | - |
| T&E Engineering | WR | COTF : Norfolk, VA. | 9.931 | 2.516 | Dec 2017 | 2.110 | Dec 2018 | 0.704 | Dec 2019 | - | | 0.704 | 2.634 | 17.895 | - |
| Int Test/Undersea Warfare | WR | Various : Various | 0.747 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.747 | - |
| TTWCS | C/CPIF | NAVAIR : Not Specified | 0.000 | 2.100 | Mar 2018 | 1.805 | Mar 2019 | 1.805 | Apr 2020 | - | | 1.805 | 3.600 | 9.310 | - |
| Sonobouys | TBD | NAVAIR : Not Specified | 0.000 | 0.000 | | 0.300 | Dec 2018 | 0.000 | | - | | 0.000 | 0.650 | 0.950 | - |
| LRLAP Test Article Procurement ITB3/ITB4 (EMD) | C/CPIF | BAE : Minneapolis, MN | 54.064 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 54.064 | - |
| LFT&E Engineering | C/CPIF | ROI : Mullica Hills, NJ | 33.652 | 1.600 | Dec 2017 | 0.600 | Dec 2018 | 0.400 | Dec 2019 | - | | 0.400 | 0.600 | 36.852 | - |
| ESSM/SM2 Procurement | C/CPIF | Raytheon : Tucson, AZ | 39.538 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 39.538 | - |
| MOE Test Bed | WR | NUWC : Various | 1.760 | 1.469 | Nov 2017 | 8.515 | Nov 2018 | 4.646 | Nov 2019 | - | | 4.646 | 1.657 | 18.047 | - |
| Component Shock Qualification | WR | Various : Various | 0.000 | 5.693 | Nov 2017 | 21.000 | Nov 2018 | 1.307 | Oct 2019 | - | | 1.307 | 21.000 | 49.000 | - |
| SDTS and Integrated Test | Various | PEO IWS : Washington, DC | 51.220 | 16.285 | Nov 2017 | 8.668 | Nov 2018 | 5.565 | Nov 2019 | - | | 5.565 | 9.298 | 91.036 | - |
| T&E Engineering | WR | NSWC : Panama City, FL | 3.530 | 0.900 | Nov 2017 | 0.500 | Nov 2018 | 0.742 | Nov 2019 | - | | 0.742 | 9.200 | 14.872 | - |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0204202N / *DDG-1000* | Project (Number/Name)<br>2464 / *DD(X) Sys Design, Dev & Integration* | |

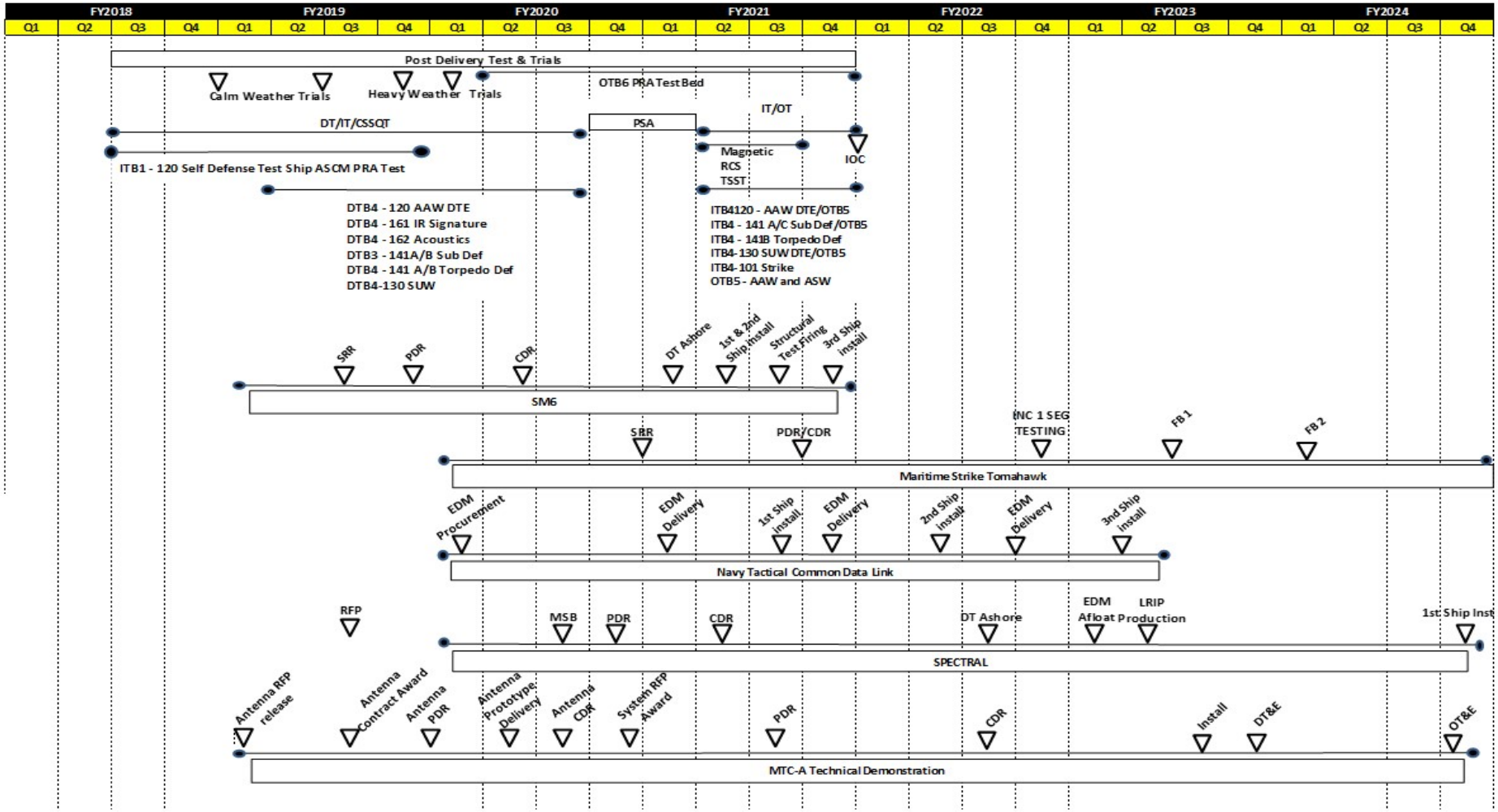
**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FSST | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 0.000 | - |
| ESSM | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 0.800 | Dec 2019 | - | | 0.800 | 0.000 | 0.800 | - |
| SM2 | Various | Various : Various | 0.000 | 0.000 | | 0.000 | | 1.400 | Dec 2019 | - | | 1.400 | 0.000 | 1.400 | - |
| Travel | Various | NAVSEA : Washington, DC | 4.455 | 1.000 | Oct 2017 | 1.000 | Dec 2018 | 0.000 | | - | | 0.000 | 1.000 | 7.455 | - |
| | | **Subtotal** | 439.246 | 68.320 | | 78.110 | | 47.520 | | - | | 47.520 | 81.224 | 714.420 | N/A |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 1,429.462 | 134.664 | | 140.264 | | 111.435 | | - | | 111.435 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0204202N / *DDG-1000* | **Project (Number/Name)**<br>2464 / *DD(X) Sys Design, Dev & Integration* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0204202N / *DDG-1000* | **Project (Number/Name)**<br>2464 / *DD(X) Sys Design, Dev & Integration* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2464*** | | | | |
| Conduct ITB1 - SDTS | 2 | 2018 | 4 | 2019 |
| Post Delivery Test & Trials | 3 | 2018 | 4 | 2021 |
| PSA | 4 | 2020 | 1 | 2021 |
| IOC | 4 | 2021 | 4 | 2021 |
| OTB6 PRA Test Bed | 2 | 2020 | 4 | 2021 |
| Calm Weather Trials 1 | 4 | 2018 | 4 | 2018 |
| Calm Weather Trials 2 | 2 | 2019 | 2 | 2019 |
| Heavy Weather Trials 1 | 4 | 2019 | 4 | 2019 |
| Heavy Weather Trials 2 | 1 | 2020 | 1 | 2020 |
| TSST | 2 | 2021 | 4 | 2021 |
| Magnetics | 2 | 2021 | 3 | 2021 |
| DTB4-120 AAW DTE, DTB4-161 IR Signature, DTB4-162 Acoustics, DTB3-141A/B Sub Def, DTB4-141 A/B Torpedo Def, DTB4-130 SUW | 2 | 2019 | 3 | 2020 |
| ITB4-120 AAW DTE/OTB5, ITB4-141 A/C Sub Def/OTB5, ITB4-141B Torpedo Def, ITB4-130 SUW DTE/OTB5, ITB4-101 Strike, OTB5 AAW and ASW | 2 | 2021 | 4 | 2021 |
| SM6 | 1 | 2019 | 4 | 2022 |
| Maritime Stirke Tomahawk | 1 | 2020 | 4 | 2024 |
| Navy Tactical Common Data Link | 1 | 2020 | 2 | 2023 |
| SPECTRAL | 1 | 2020 | 4 | 2024 |
| MTC-A Technical Demonstration | 1 | 2019 | 4 | 2024 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 327.817 | 22.762 | 42.398 | 101.339 | - | 101.339 | 99.347 | 91.098 | 110.888 | 113.094 | Continuing | Continuing |
| 2134: *Shipboard IW Exploit* | 327.817 | 22.762 | 42.398 | 53.496 | - | 53.496 | 56.440 | 48.802 | 57.618 | 58.775 | Continuing | Continuing |
| 2174: *Distributed Common Ground System-Navy (DCGS-N)* | 0.000 | 0.000 | 0.000 | 0.583 | - | 0.583 | 0.589 | 0.669 | 0.675 | 0.678 | Continuing | Continuing |
| 2227: *Distributed Common Ground System (DCGS-N) Inc 2* | 0.000 | 0.000 | 0.000 | 42.745 | - | 42.745 | 37.688 | 36.941 | 34.460 | 35.143 | Continuing | Continuing |
| 3091: *Advanced Cryptological Sys Eng (CCOP)* | 0.000 | 0.000 | 0.000 | 4.515 | - | 4.515 | 4.630 | 4.686 | 4.835 | 4.932 | Continuing | Continuing |
| 3431: *Distributed Operations* | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 13.300 | 13.566 | Continuing | Continuing |

**Note**

To ensure resources are aligned to enable rapid capability delivery, funding has been realigned into PE 0304785N (Tactical Cryptologic System) from the following Program Elements/Projects as part of RDTEN PE Consolidation starting in FY 2020: PE 0305208N (Distributed Common Ground Sys) Project 2174 (Distributed Common Ground System-Navy (DCGS-N)) and Project 2227 (DCGS-N Increment 2), and PE 0204574N (Advanced Cryptologic Systems Engineering) Project 3091 (Advanced Cryptologic Carry On Program (CCOP)). There are no New Starts associated with PE Consolidation.

**A. Mission Description and Budget Item Justification**

The Shipboard Information Warfare (SIW) line includes the Ship's Signal Exploitation Equipment (SSEE) Family of Systems (FoS) which include Increment E, Increment F (and its variants), Spectral and Modifications, as well as the Integrated Communications Data System (ICADS) Increment I and Increment II. These programs are classified Information Warfare (IW) / Electronic Warfare (EW) tactical cryptologic systems supporting Command and Control, Battlespace Awareness, Electromagnetic Maneuver Warfare / Integrated Fires (EMW/IF) modes of global engagement. These systems enable power projection at the strategic level in any environment including communications challenged situations (previously referred to as Anti-Access, Area Denial (A2AD)) across the globe and provide offensive EW capabilities at the tactical level, ensuring surface vessels ability to disrupt, deny, degrade and defeat adversary (state and non-state) use of the radio frequency spectrum while simultaneously providing advanced Information Related Capabilities (IRC) to maritime warfighters. SSEE systems detect adversary radio frequency emissions and use them to provide critical tactical and strategic intelligence, situational awareness, and hostile threat assessment depriving the adversary of enhanced signals exploitation capability and limiting their ability to counter strike. The systems are incremental acquisition programs designed to pace adversary communications technology development by using Research, Development, Test & Evaluation (RDT&E) funding to rapidly develop and transition new technologies and provide new capabilities as Pre-Planned Product Improvement (P3I) upgrades into the system's hardware/software configuration via a net-centric Service Oriented Architecture (SOA). Funding will focus on developing and delivering expanded offensive IW / EW and future Cyberspace capabilities in accordance with Presidential direction and in support of multiple Operational Plans (OPLANS) and communications challenged scenarios. ICADS Increment II is a mission critical system providing advanced simulation capability for naval platforms as well as back-up communications capabilities. Additional details for these programs are held at a higher classification level. The Advanced Cryptologic Systems Engineering

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* |

The Distributed Common Ground System - Navy (DCGS-N) is the Navy's portion of the Under Secretary of Defense, Intelligence (USD (I)) DCGS Family of Systems (FoS). The Department of Defense (DoD) has defined a DCGS architecture that will be compatible and interoperable across all of the Services' Intelligence, Surveillance and Reconnaissance (ISR) systems and operations. DCGS accesses and ingests data from spaceborne, airborne, subsurface, and surface ISR collection assets, intelligence databases and intelligence producers. This collected data is shared across a joint enterprise using the DCGS Integration Backbone (DIB) and in time, the Defense Intelligence Information Enterprise (DI2E) to enhance access and sharing of ISR information across Joint forces through the use of common enterprise standards and services. DCGS FoS supports Joint Task Force (JTF)-level and below combat operations with critical intelligence for battle management and information dominance across the full spectrum of operations, including peace, conflict, war, and Overseas Contingency Operations (OCO). DCGS is a cooperative effort between the services, agencies, and DoD to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. DCGS-N core components include the analyst workstation from the Global Command and Control System (GCCS) - Integrated Imagery and Intelligence (I3), Generic Area Limitation Environment (GALE) Signals Intelligence (SIGINT), Common Geo-positioning Services (CGS), Image Product Library (IPL) or Information Store (iSToRE), Modernized Integrated Database (MIDB), Joint Concentrator Architecture (JCA) and Track Management Services (TMS).

The DCGS-N system represents the integration of 1) The processing and exploitation of tactical and Imagery Intelligence (IMINT) and SIGINT; 2) Precision target geopositioning, mensuration, and imagery dissemination capabilities; 3) Selected national IMINT requirements and processing capabilities from the National Geospatial-Intelligence Agency (NGA); and 4) Sharing of Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) and Command and Control information via DIB, DI2E, and Net-Centric Enterprise Services (NCES) standards with a wide range of customers (e.g., Global Command and Control System - Maritime (GCCS-M), Joint Mission Planning System (JMPS), and many others). The DCGS-N system efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion.

The DCGS-N Enterprise Node (DEN), which incorporates current DIB standards and DI2E policy, facilitates interoperability and data sharing among the DCGS FoS. DCGS-N ensures compliance with the DoD DCGS network architecture.

The Navy is establishing an ISR Enterprise way ahead that will emphasize a reach back strategy to provide intelligence products to support deployed ship and shore operations. The Navy will also migrate to a Service Oriented Architecture (SOA) that requires the integration and testing of a Maritime ISR Enterprise capabilities, migration of ISR applications to a SOA environment, and integration to leverage a Common Computing Environment (CCE) and the Intelligence Community Information Technology Enterprise (IC ITE). DCGS-N will also become the focal point for migration of Maritime Domain Awareness (MDA) fusion and analysis Maritime Fusion & Analysis (MFAS) tool applications for the Navy. Additionally, Intelligence Surveillance and Reconnaissance (ISR) funding supports development and integration efforts to fuse Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) data collected, exploited and disseminated by ISR systems with other intelligence data and automatically provide to shipboard combat systems to support kinetic (bombs, mortars, missiles, bullets) and non-kinetic fires (electronic attack, lasers, cyber-attack) and more effective exploitation of the electromagnetic spectrum. ISR systems will play key roles in enabling the national-to-tactical integration necessary for an integrated maritime targeting capability in support of kinetic and non-kinetic fires.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* |

Distributed Common Ground System-Navy (DCGS-N) Increment 1 is the Navy's current in service DCGS ISR&T program of record. The system is actively used by Navy force level ships and shore sites in support of the mission. DCGS-N Increment 1 is currently performing technical refreshes to Windows 10 (WIN 10) per the Department of Defense's initiatives while enabling the long-term transition to DCGS-N Increment 2.

Intelligence Carry-On Program (ICOP) is a suite of multi-source intelligence and analytical capabilities which includes an integrated Three-Dimensional (3-D) operational picture displaying intelligence and other data sources to provide a richer and more complete picture of the battle space on Unit Level platforms. The system supports a full motion video capability that receives, processes, exploits, and disseminates organic and non-organic data as well as the ability to process and correlate Electronic Intelligence (ELINT) and external Communications Intelligence (COMINT Externals). It integrates mature Commercial Off-the-Shelf (COTS) and Government Off-the-Shelf (GOTS) applications with shared storage and communication paths to reach back to the DCGS-N Enterprise Node (DEN), and to provide data sharing to the Maritime Operations Centers (MOC) and national ISR systems, making tactical users a part of the larger ISR enterprise.

DCGS-N Increment 2 addresses a critical shortfall in Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) capability and capacity to support operational, tactical planning, and execution across the full range of joint military operations. Existing TCPED shortfalls will be exacerbated by planned Navy, Joint, and Allied fielding of new ISR platforms. Currently fielded systems provide localized processing capabilities that will be overwhelmed in future years without a significant change in the way the Navy processes, exploits and disseminates intelligence data. DCGS-N Increment 2 will perform quick and affordable integration of emergent transformational COTS and GOTS technologies in support of information warfare and overall efforts required to pace the threat. DCGS-N Increment 2 will deliver all source fusion and analytical capabilities; provide MDA capabilities and integrate TCPED capabilities to improve the use and analysis of sensor and platform data. DCGS-N Increment 2 will be based on an enterprise solution to share this information across commands, services, and agencies to promote shared situational awareness. DCGS-N Increment 2 consists of multiple releases. The first release (Fleet Capability Release 1 (FCR-1)) provides an enhanced Navy ISR enterprise that converges and builds on the DCGS-N Increment 1 Enterprise Node; leverages the Defense Intelligence Information Enterprise (DI2E); is compliant with the Common Computing Environment (CCE) and the Community Information Technology Enterprise (IC ITE); federates ISR and TCPED workflow and production; exploits new and evolving unmanned systems sensor data; provides Multi-Intelligence (Multi-INT) cross-queuing and modular tools. The second release (Fleet Capability Release 2 (FCR-2)), enhances afloat ISR capabilities by providing a set of software centric tools providing Multi-INT fusion and analysis, behavior prediction and intelligent knowledge management designed to operate in disconnected or denied communications environment. The third release (Fleet Capability Release 3 (FCR-3), enhances embedded training to include new modified capabilities, automatic exploitation of motion imagery, ability to define, detect, and display anomalies, ability to observe entities with target list items, fusion of observation reports to detect non-emitting vessels, enhanced alerting and enterprise connectivity detection. DCGS-N Increment 2 will insert new technology enhancements via incremental software & hardware upgrades and deliver as annual build release. Follow-on releases will be developed based on Fleet requirements.

The Cryptologic Carry-on Program (CCOP) rapidly develops and fields state-of-the-art signal acquisition capabilities in response to Combatant Command requirements for a quick-reaction surface cryptologic carry-on capability. There are 124 cryptologic capable surface ships and shore sites in the current Navy inventory; each of these is a potential user of this carry-on equipment, depending on deployment schedules and the tempo of operations. In addition, numerous Navy and Coast Guard platforms are other potential users.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* |

In FY 2020, SSEE Increment F (and its variants) will continue to develop, refine, and test new, unexplored and unexploited signal and cyber capabilities and integrate solutions to incorporate other Navy development investments to enhance the Fleet's ability to dominate and defend cyberspace mediums, insert new technology enhancements via incremental software and hardware upgrades and to deliver as required to maximize system effectiveness. Specifically, Increment F will continue development in support of software and hardware development for VITA 49 / VPX Next-Generation Chassis to deliver advanced capabilities in a dynamic environment while integrating hosting services to platforms, bringing an enhanced modular, mission-tailorable system infrastructure specifically required for National/Tactical integration. Funding will also finalize development for solutions intended to meet Joint interface and compliance standards (4.X). SSEE Increment F also continues to integrate capabilities able to operate in communications challenged environments into the system configuration.

In FY 2020, Spectral will continue acquisition, logistics, test planning, and contracting activities, while beginning development and engineering of capabilities and subsystems to be incorporated into Engineering Design Models (EDMs) required under Fleet Capability Release - 1 (FCR-1). FY 2020 for SSEE Modifications supports continued hardware and software development to bring advanced capabilities to the Fleet for simultaneous detection, collection, processing, electronic warfare and display of communication intelligence data from hostile, high threat and adversary platforms in select extended frequency ranges not prosecuted today. It will continue development to integrate designs to bring advanced signal processing to the Next Generation-GRAYWING capability while migrating to meet future industry backplane standards to align with Common Core Architecture (CCA) strategies.

In FY 2020, Integrated Communications and Data Systems Increment II (ICADS Inc. II) will support EDM - 1 development, testing and demonstration of system capability running in accordance with Commander, U.S. Pacific Fleet (COMPACFLT) requirements as well as all the necessary technical, acquisition and contracting documentation to bring additional EDM's.

In FY 2020, DCGS-N Increment 1 will continue development, integration and regression testing required to remain aligned with national imagery standards to be incorporated into technology refreshes for Win 10 upgrades.

In FY 2020, Intelligence Carry-On Program (ICOP) will commence integration and testing events in support of F35 Block 3 and Triton. In addition, ICOP will perform interoperability testing with new capabilities such as minotaur and project maven to align with Integrated Fires (IF) / Electromagnetic Warfare (EMW) concepts.

In FY 2020, DCGS-N Increment 2 will award a Contract that will support the Government LSI for integration, assembly and test of commercial items, COTS, and GOTS components procured for the DCGS-N Increment 2 baseline. Currently this support is provided on several task orders on several contract vehicles. This contract will consolidate that work into a single contract to cover integration of capabilities in FCR-3 through Fleet Capability Release 5 (FCR-5), and ensure Distributed Common Ground System-Navy (DCGS-N) Increment 2 interoperability with the DCGS-N Family of System (FoS), the multi-service and Intelligence Community DCGS FoS, and the Consolidated Afloat Networks and Enterprise Services (CANES) system. DCGS-N Increment 2 will install one (1) unit for Initial Operational Test and Evaluation (IOT&E). DCGS-N Inc 2 will complete integration of Fleet Capability Release 3 (FCR-3) and conduct an In Progress Test Review and Integrated Test of the FCR-3 build including rigorous cyber security testing. DCGS-N Increment 2 will continue to integrate a standard software baseline for the DCGS Family of Systems (FoS). DCGS-N Increment 2 will begin planning for Fleet Capability Release 4 (FCR-4) including developing the Requirements Definition Package (RDP), preparing for the Build Technical Review and Build Decision. DCGS-N Increment 2 will continue Passive Targeting Efforts leveraging Office of Naval Research (ONR) Electromagnetic Battle Management (EMBM) Future Naval Capabilities (FNC) to network and fuse Passive Targeting Data. Intelligence Surveillance and Reconnaissance (ISR) funding

supports development and integration efforts to fuse Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) data collected, exploited and disseminated by ISR systems with other intelligence data and automatically provide to shipboard combat systems to support kinetic (bombs, mortars, missiles, bullets) and non-kinetic fires (electronic attack, lasers, cyber-attack) and more effective exploitation of the electromagnetic spectrum. Intelligence, Surveillance, Reconnaissance (ISR) systems will play key roles in enabling the national-to-tactical integration necessary for an integrated maritime targeting capability in support of kinetic and non-kinetic fires.

In FY 2020, Cryptologic Carry On Program (CCOP) will continue to integrate, test, and document identified COTS and GOTS technologies and subsystems that meet emergent and on-going Fleet requirements as specified in the SOI and target threat list, as well as, continue to develop upgrades to existing systems and subsystems according to Fleet requirements. Funds aid the development of new signal processing algorithms and software based solutions to enable rapid transition of capability to permanently installed SSES systems, including SSEE Family of Systems (FoS) and its variants, the research of self-contained small form factor systems for Patrol craft and other small units, and the research of Adaptive Mission Modules for rapid insertion to counter specific threats or provide intelligence in specific areas of operation. More details are available at higher classification.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 28.311 | 44.098 | 47.173 | - | 47.173 |
| Current President's Budget | 22.762 | 42.398 | 101.339 | - | 101.339 |
| Total Adjustments | -5.549 | -1.700 | 54.166 | - | 54.166 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | -1.700 | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | -0.007 | 0.000 | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • Program Adjustments | 0.000 | 0.000 | 54.543 | - | 54.543 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | -0.377 | - | -0.377 |
| • Congressional Directed Reductions Adjustments | -5.542 | - | - | - | - |

**Change Summary Explanation**

The FY 2020 funding request was reduced by $1.736M to account for the availability of prior year execution balances.

The funding increased from FY 2019 to FY 2020 by $49.843M due to the PE consolidation, which transferred funding from PE 0305208N Project 2174, PE 0305208N Project 2227, and PE 0204574N Project 3091 into PE 0304785N.

Additionally, there was an increase from FY 2019 to FY 2020 of $8.548M due to support Spectral EDM development for both shore and afloat based systems and to support creating a Development Operations environment.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2134 / *Shipboard IW Exploit* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2134: *Shipboard IW Exploit* | 327.817 | 22.762 | 42.398 | 53.496 | - | 53.496 | 56.440 | 48.802 | 57.618 | 58.775 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

The FY 2020 funding request was increased by $11.098M to support Ship's Signal Exploitation Equipment (SSEE) Family of Systems (FoS) (which includes SSEE Increment E, SSEE Increment F (and its variants), Spectral and SSEE Modifications), and Integrated Communications Data System (ICADS) (which includes ICADS Increment I and ICADS Increment II)). These programs are classified Information Warfare (IW) / Electronic Warfare (EW) tactical cryptologic systems supporting all facets of Assured Command and Control, Battlespace Awareness, Electromagnetic Maneuver Warfare / Integrated Fires (EMW/IF) modes of global engagement and provide both battle group and combatant commanders with real-time indications and warnings by acquisition ("Find") and localization ("Fix") of Signals of Interest (SOI) as well as provide the Surface Fleet's only EW non-kinetic capabilities ("Finish"). The SSEE Increment F variants bring a new dimension of afloat Signals Intelligence (SIGINT) capabilities by providing advanced scalability and modularity for mission planners to execute. SSEE Modifications is a classified tactical signals intelligence frequency extension capability that integrates and interoperates with SSEE Increment F host system. SSEE Modifications is broken into two major components, Paragon which provides simultaneous detection, collection, processing, Information Operations (IO) and display of communication intelligence data from hostile, high threat and adversary platforms in select frequency ranges not prosecuted or countered with the host system, and the Graywing subsystem which is an advanced common data link system with SSEE Increment F systems. Spectral however, is the Navy's next-generation SIGINT, EMW, and IO weapons system to provide scalable, mission configurable, and modular capabilities using a common user interface through an open software architecture to allow rapid integration and deployment of special use capabilities satisfying Navy and Joint maritime intelligence requirements beyond any existing system could match. Spectral will rapidly deliver enhancements in spectrum coverage, advances in antenna technologies, and improvements in integration with other Radio Frequency (RF) systems, combat systems, and other data interfaces to bring a together a comprehensive integrated cryptologic intelligence picture. As an incremental acquisition program, Research, Development, Test & Evaluation (RDT&E) funding is required to rapidly develop and integrate new technologies and associated new operational capabilities to pace both known and future signal threats and transition as Pre-Planned Product Improvement (P3I) upgrades into the system's hardware / software configuration and deliver to fielded systems as required to satisfy Fleet needs. Program funding incorporates P3I, new Commercial-Off-The-Shelf (COTS) or Government-Off-the-Shelf (GOTS) based technologies, and software into the existing systems to address Fleet needed priorities, capability gaps or combat known threats. Funding also focuses on developing and delivering expanded non-kinetic EW capabilities and net-centric Service Oriented Architecture (SOA), as well as meeting intended interoperability objectives through Fleet defined Common Core Architectures (CCA) to enable application hosting services; all in accordance with Presidential direction and strategic objectives while also in support of multiple Operational Plans (OPLANS), Concepts of Operations (CONOPS) and communications challenged scenarios (previously known as Anti-Access Area Denial) (further details held at a higher classification level). SSEE FoS will continue development and integration of capabilities able to operate in those communications challenged environments solutions for the SSEE Increment F, SSEE Modifications, and Spectral systems as well as bring enhanced signals exploitation and expanded SOI processing capabilities to fielded systems. Funding supports development and integration efforts to fuse data produced and distributed by Shipboard IW/Information Operations (IO) systems with other intelligence data at multiple classification levels and provided to shipboard combat systems to support kinetic and non-kinetic fires. It can also be used to enable a more complete understanding and more agile and effective exploitation of the electromagnetic spectrum.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

FY 2020 funding for SSEE Increment F (and its variants) will continue to develop, refine, and test new, unexplored and unexploited signal and cyber capabilities and integrate solutions to incorporate other Navy development investments to enhance the Fleet's ability to dominate and defend cyberspace mediums, insert new technology enhancements via incremental software and hardware upgrades and to deliver as required to maximize system effectiveness. Specifically, Increment F will continue development in support of software and hardware development for VITA 49 / VPX Next-Generation Chassis to deliver advanced capabilities in a dynamic environment while integrating hosting services to platforms, bringing an enhanced modular, mission-tailorable system infrastructure specifically required for National/ Tactical integration. Funding will also finalize development for solutions intended to meet Joint interface and compliance standards (4.X). SSEE Increment F also continues to integrate capabilities able to operate in communications challenged environments into the system configuration.

FY 2020 funding for Spectral will continue acquisition, logistics, test planning, and contracting activities, while beginning development and engineering of capabilities and subsystems to be incorporated into Engineering Design Models (EDMs) required under Fleet Capability Release - 1 (FCR-1). FY 2020 for SSEE Modifications supports continued hardware and software development to bring advanced capabilities to the Fleet for simultaneous detection, collection, processing, electronic warfare and display of communication intelligence data from hostile, high threat and adversary platforms in select extended frequency ranges not prosecuted today. It will continue development to integrate designs to bring advanced signal processing to the Next Generation-GRAYWING capability while migrating to meet future industry backplane standards to align with Common Core Architecture (CCA) strategies.

With finalized Spectral requirements and specifications, changes have been made to the schedule which include shifting Milestone B decision from QTR 3 FY 2018 to QTR 3 FY 2020, and Fleet Capability Release (FCR) Integration Test from QTR 2 FY 2020 to QTR 4 FY 2023. Production Representative/Engineering Design Model (EDM) development begins in QTR 2 FY 2020, and Fleet Capability Release (FCR)-1 begins in QTR 1 FY 2023. Additionally, it added an EDM Integration Test and Operational Assessment in QTR 3 and QTR 4 FY 2022 respectively.

FY 2020 funding for Integrated Communications and Data Systems Increment II (ICADS Inc. II) will support EDM - 1 development, testing and demonstration of system capability running in accordance with Commander, U.S. Pacific Fleet (COMPACFLT) requirements as well as all the necessary technical, acquisition and contracting documentation to bring additional EDM's.

Revised Fleet requirements for ICADS Inc. II coupled with a delayed start in acquisition and engineering, forced adopting a new hybrid acquisition model to ensure rapid system prototyping. The following changes have made to the ICADS schedule: Milestone C shifted from QTR 1 FY 2020 to QTR 4 FY 2021, Integration Test -1 moved from QTR 4 FY 2018 to QTR 4 FY 2021 and Production Representative -1 delivery from QTR 4 FY 2018 to QTR 1 FY 2021.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Ship's Signal Exploitation Equipment Inc F (SSEE Inc F) | 6.487 | 8.148 | 12.589 | 0.000 | 12.589 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to develop Joint interface compliance standards (4.X) while creating netted sensor framework strategies and delivering enhanced automation capabilities to expedite sensor tasking and control and ease | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| operator workflows. Continue Pre-Planned Product Improvements (P3I) to develop and deliver EW capabilities based upon the warfighter identified FY19 Signals of Interest (SOI) threats (annually-updated) for integration into the SSEE Increment F system and deliver as required to meet Fleet requirements. Develop, refine, and test new, unexplored and unexploited cyber capabilities as well as begin integration solutions to incorporate other Navy development investments to enhance the Fleet's ability to dominate and defend cyberspace mediums and insert new technology enhancements via incremental software and hardware upgrades. Continue software and hardware development for VITA 49/ VPX Next-Generation Chassis designs and integrate capabilities operating in communications challenged environments into this new open architecture framework creating a modular, mission-tailorable capability specifically required for National / Tactical mission integration. Design system interfaces and data flow techniques to enable advanced National / Tactical Integration with U.S. Navy Surface Cryptologic Systems by deploying NSAnet afloat while adhering to national cybersecurity initiatives by bringing advanced inter-strike group network capabilities able to operate in any environment as well as develop, test and integrate advanced, targeted maritime IW capabilities and techniques in support of the Deputy Secretary of Defense Management Action Group (DMAG) Asia-Pacific Security Initiatives (APSI). Began initial requirements definition for integration and interoperability of SSEE to the Distributed Data Transfer Service, Cross Domain Systems and Common Tactical Manager as part of the Electromagnetic Maneuver Warfare / Integrated Fires (EMW/IF) concept. | | | | | |
| ***FY 2020 Base Plans:***<br>Continue Pre-Planned Product Improvement (P3I) to provide enhanced capabilities into the SSEE Increment F system and its variants by continuing to develop, refine, and test new, unexplored and unexploited cyber capabilities as well as finalize integration solutions to incorporate other Navy development investments to enhance the Fleet's ability to dominate and defend cyberspace mediums and insert new technology enhancements via incremental software and hardware upgrades. Intent is to transition from annual software builds to delivering incremental software updates as required to maximize Fleet readiness and its cybersecurity posture. Finalize Joint interface development and compliance standards (4.X) to create a netted sensor framework strategy and deliver enhanced automation capabilities to expedite sensor tasking and control and ease operator workflows. Develop and deliver EW capabilities based upon the warfighter identified FY20 Signals of Interest (SOI) threats (annually-updated) for integration into the SSEE Increment F systems (including variants) and deliver as required to meet Fleet requirements. Continue VITA 49 / VPX Next-Generation Chassis development by including modifications to provide enhanced data processing, and greater exposure of existing system services while meeting constricting Space, Weight, Power and Cooling (SWPaC) requirements on ships. Also continue to integrate specialized signal processing capabilities (including MEDUSA, ACES and SILK | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| THREAD functionality) into the new architecture to both modernize and increase performance to posture for future SIGINT threats, maximizing hosting environment utility. Continue to develop the architecture, network performance specifications, and hosting environment to bring NSAnet afloat by deploying Navy Tactical Data Network (NTDN) to Carrier Strike Group. This is done to adhere to national cybersecurity initiatives and bring advanced inter-strike group network capabilities able to operate in any environment while continuing to integrate Cryptologic systems with shipboard combat systems for tightly coupled mission execution. This also brings high-side fusion and battle management aids within the SSEE FoS. Begin necessary documentation for system/network testing, production and installation for designated CVN installation while taking ownership of initial prototypes. Continue development and integration capabilities able to operate in communications challenged environments to maintain cognizance of current warfighter-identified signal sets and make additions and improvements to the system as required by National and Fleet stakeholders. It also supports increasing Sensitive Compartmented Information (SCI) compute power within the Ship's Signal Exploitation Space (SSES), the only SCI accredited space within most ships, bringing high-side fusion and battle management aids within the SSEE FoS Hosting Environment.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The funding increase from FY 2019 to FY 2020 is for additional testing and demonstration for A2AD capabilities Navy Tactical Data Network (NTDN) initial capability roll-out. Additional details are held at a higher classification. | | | | | |
| ***Title:*** Spectral | 9.319 | 18.731 | 27.279 | 0.000 | 27.279 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>With re-phased and adjusted schedule capturing new acquisition strategy, Spectral will achieve programmatic development RFP Decision to solicit Spectral system development contract in FY 2019. Initial activity under the planned the Spectral development contract includes initial Engineering Design Models (EDM) system development, individual capability development within the Spectral requirement band, as well as establish a virtual Development Environment used to quickly engineer and integrate capability while having multiple vendors and engineering resources develop. Continue acquisition activities, systems engineering, logistics, test planning, finalizing the Test & Evaluation Master Plan (TEMP) and contracting activities in support of the Development RFP and subsequent Milestone B decision. With re-phased milestone, FY 2019 will initiate | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| development efforts to build the initial EDMs (Ashore and Afloat). The initial EDMs are intended to be used for systems testing and lab-based capability integration, initial training, and to refine requirements, technical data packages and matrices in preparation for Requirements Development Plan (RDP) approval and Build Decision - 1 (BD-1). Refine advanced or next-generation SIGINT, cyber, IO, or EW capabilities that are beyond or exceed performance requirements scope of currently fielded systems including SSEE Increment F, to be incorporated into the Spectral baseline as well as make available for immediate Fleet introduction via fielded Capability Drops. Spectral Capability Drops brings developed capability in support of EDM development immediately to the Fleet by having the solution parsed and integrated into fielded systems. Continue afloat combat systems integration and execute studies, analysis and engineering efforts for market research to support Advanced Radio Frequency (RF) aperture development and integration. It also satisfies Fleet needs for multi-mission antennas and control modules as part of the Spectral requirement while also expanding upon the Information Warfare (IW) / Electronic Warfare (EW) and tactical Cryptologic system capability of exploiting signals throughout the RF spectrum. | | | | | |
| ***FY 2020 Base Plans:***<br>Complete documentation and acquisition activity to achieve programmatic Milestone B decision and award the prime system integrator and development contract towards delivering a EDM Ashore. Initiate procurement of the EDM hardware for below-deck equipment; continue to build, assemble, and integrate hardware as well as procure developmental equipment to support the necessary lab-based and Development Operations environments that will quickly engineer and integrate capability into the software baseline as well as develop advanced or next-generation SIGINT, cyber, IO, or EW capabilities beyond or in excess of performance requirements scope of currently fielded systems including SSEE Increment F. This includes having virtual software development environment for enhanced configuration management through Web-based services and applications for a robust, open, modular development environment. Continue Engineering Design Model (EDM) and Capability Drop development focusing on engineering efforts outlined in FY 2020 Fleet Integrated Priority and Integrated Priority Capability lists. FY20 EDM development establishes the initial software and hardware baseline configurations and common core capabilities associated with the next generation system, including enhanced requirements to integrate the systems with Ship's Combat and Intelligence Systems to support Integrated Fires and Electromagnetic Maneuver Warfare and the capabilities able to operate in communications challenged environments in the operating frequency bands outside that of fielded systems. As those capabilities mature and become available, they are made available to be immediately fielded via Capability Drops to satisfy any prioritized Fleet requirement. Initiate system design to include an expanded mission module hosting environment, advanced Information Warfare (IW) / Electronic Warfare (EW) cyberspace capabilities capable of exploiting signals throughout the RF spectrum. Initiate test plans to support Developmental and Operations | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Assessments against the EDM systems. With finalized afloat combat systems integration studies, analysis, and engineering efforts to support Advanced Radio Frequency (RF) aperture development and integration complete, Advanced RF Aperture Development effort to match the expanded capability is required to meet future SOI threats. Engineering and design in topside maritime antennas enables execution of full functionality and scope of Spectral requirements.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The funding increase from FY 2019 to FY 2020 supports EDM development for both shore and afloat based systems in alignment with established U.S. Navy cryptologic requirements definition through the established initial software and hardware baselines. Efforts include engineering and design of hardware components, software configuration management, user interfaces, coordination and planning. It also funds support creating a Development Operations environment. | | | | | |
| ***Title:*** Ship's Signal Exploitation Equipment Modifications (SSEE Modifications) | 4.498 | 5.682 | 5.328 | 0.000 | 5.328 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continue to execute hardware and software development via annual software release to bring further advanced capability to the Fleet within the expanded Radio Frequency (RF) ranges such as delivering advanced Directional Finding (DF) algorithms to increase geolocation accuracy and integrating new exploitation techniques to address emerging signal threats, while delivering advanced capability to the Fleet through simultaneous detection, collection, processing, electronic warfare, and geographical display of communication intelligence data from hostile, high threat and adversary platforms. Continue designs to bring advanced signal processing to the Next Generation-GRAYWING capability. Begin engineering development and system designs to meet future industry backplane interconnectivity standards to align with CCA strategies. Continue development and integration of capabilities able to operate in communications challenged environments as well as deliver enhanced Signals exploitation and expanded SOI processing capabilities and signal acquisition algorithms to fielded systems. Complete Joint Interoperability Test Center (JITC) certification testing.<br>***FY 2020 Base Plans:***<br>Continue to execute hardware and software development via annual software release to bring further advanced capability to the Fleet within the expanded Radio Frequency (RF) ranges and integrate new exploitation techniques to address emerging signal threats, while delivering advanced capability to the Fleet through | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| simultaneous detection, collection, processing, electronic warfare, and geographical display of communication intelligence data from hostile, high threat and adversary platforms. Restore any hardware or software discrepancies or system bugs stemming from Initial Operational Test & Evaluation test reports. Continue engineering to bring advanced signal processing to the Next Generation-GRAYWING capability to be integrated into the SSEE FoS hosting environments. Continue engineering development and system designs to meet future industry backplane interconnectivity standards to align with CCA strategies. Continue development and integration of capabilities able to operate in communications challenged environments as well as deliver enhanced Signals exploitation and expanded SOI processing capabilities and signal acquisition algorithms to fielded systems.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The funding decrease from FY 2019 to FY 2020 is due to a reduction in SSEE Modifications Software Problem Report (SPR) engineering development resolving software bugs and deficiencies. | | | | | |
| ***Title:*** Integrated Communications and Data Systems Increment II (ICADS Inc II) | 2.458 | 9.837 | 8.300 | 0.000 | 8.300 |
| ***Articles:*** | - | 1 | - | - | - |
| ***FY 2019 Plans:***<br>Continue acquisition and systems engineering activities associated with the development of the first ICADS Increment II Production Representative (PR). Complete ICADS Increment II design reviews including Preliminary Design Review (PDR) and begin preparation for Critical Design Review (CDR). Continue development of all necessary acquisition, systems engineering, logistics, training development activities and documentation in support of Request for Proposal (RFP) release.<br>***FY 2020 Base Plans:***<br>Finalize delivery of Production Representative (PR)-1. Complete CDR and RFP while complete all necessary acquisition, systems engineering, logistics, training development in support of the Low-Rate Initial Production (LRIP) / Milestone C decision. Complete development of all technical drawings and contractual documentation in preparation for Request for Proposal (RFP) contract release to support production of the ICADS LRIP and Full-Rate Production systems.<br>***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The funding decrease from FY 2019 to FY 2020 is a result of completed engineering development, acquisition and technical documentation and preliminary design reviews supporting the completion of the first ICADS Increment II Production Representative system. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 22.762 | 42.398 | 53.496 | 0.000 | 53.496 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN / 2360: *Shipboard IW Exploit* | 216.615 | 218.103 | 194.758 | - | 194.758 | 235.478 | 286.193 | 344.917 | 297.453 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

Acquisition, management and contracting strategies support engineering, manufacturing development and production by providing funds to a Prime Contractor and Space & Naval Warfare Systems Command (SPAWAR) Systems Center (SSC) - Atlantic, SPAWAR Systems Center - Pacific and miscellaneous contractors, with management and contract oversight by SPAWAR HQ.

**E. Performance Metrics**

Ship's Signal Exploitation Equipment (SSEE) Increment F will incorporate pre-planned product improvements to provide enhanced or additional capabilities into the system to increase performance and capability while maximizing value to the Navy. SSEE Increment F improvements along with the addition of the SSEE Modifications and Medusa capabilities will expand signals of interest processing capability to allow collection of the newest high priority modern technology threat signals for tightly integrated Information Operations (IO) / non-kinetic capabilities in support of time critical military strike operations and subsequent processing and analysis for timely and accurate situational awareness for force protection. Paragon is a classified Navy tactical signals intelligence frequency extension capability that will be integrated into Ship's Signal Exploitation Equipment Increment E and F programs. Spectral will expand upon the Information Warfare (IW) / Electronic Warfare (EW) and tactical cryptologic system capability of exploiting signals throughout the Radio Frequency (RF) spectrum, in addition to focusing new technologies towards new and previously unexplored and unexploited cyber capabilities as we integrate into the Electromagnetic Maneuver Warfare (EMW) Integrated Fires (IF) architecture.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2134 / *Shipboard IW Exploit* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Prior Years | Various | Various : Various | 158.330 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 158.330 | - |
| Systems Engineering | C/CPAF | Classified Contract : Classified Contract | 12.318 | 1.670 | Dec 2017 | 4.307 | Dec 2018 | 4.431 | Dec 2019 | - | | 4.431 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | SSC PAC : San Diego, CA | 5.403 | 0.889 | Oct 2017 | 1.385 | Oct 2018 | 1.385 | Dec 2019 | - | | 1.385 | Continuing | Continuing | Continuing |
| Systems Engineering | WR | SSC LANT : Charleston, SC | 6.867 | 0.616 | Oct 2017 | 1.600 | Oct 2018 | 1.248 | Dec 2019 | - | | 1.248 | Continuing | Continuing | Continuing |
| Primary Hardware Development ICADS | C/CPFF | Classified Contracts : Classified Contracts | 0.000 | 0.000 | | 0.000 | | 4.006 | Dec 2019 | - | | 4.006 | 0.000 | 4.006 | - |
| Primary Hardware Development Spectral | C/CPFF | Classified Contracts : Classified Contracts | 0.000 | 0.000 | | 0.000 | | 10.917 | Dec 2019 | - | | 10.917 | 0.000 | 10.917 | - |
| Training Development | C/CPFF | Classified Contracts : Classified Contracts | 0.000 | 0.265 | Dec 2017 | 0.413 | Dec 2018 | 0.421 | Dec 2019 | - | | 0.421 | Continuing | Continuing | Continuing |
| Software Development ICADS | C/CPAF | Classified Contracts : Classified Contracts | 0.000 | 0.000 | | 0.000 | | 2.136 | Dec 2019 | - | | 2.136 | 0.000 | 2.136 | - |
| Configuration Management | WR | SSC LANT : Charleston, SC | 0.000 | 0.316 | Oct 2017 | 1.231 | Oct 2018 | 1.269 | Dec 2019 | - | | 1.269 | Continuing | Continuing | Continuing |
| Software Development Spectral | C/CPAF | Classified Contracts : Classified Contracts | 0.000 | 0.000 | | 0.000 | | 6.814 | Dec 2019 | - | | 6.814 | 0.000 | 6.814 | - |
| Training Development | WR | SSC LANT : Charleston, SC | 0.000 | 0.168 | Oct 2017 | 0.349 | Oct 2018 | 0.356 | Dec 2019 | - | | 0.356 | Continuing | Continuing | Continuing |
| Integrated Logistic Support | WR | SSC LANT : Charleston, SC | 0.000 | 0.442 | Oct 2017 | 0.984 | Oct 2018 | 1.004 | Dec 2019 | - | | 1.004 | Continuing | Continuing | Continuing |
| Requirements Analysis | WR | SSC LANT : Charleston, SC | 0.000 | 0.395 | Oct 2017 | 0.615 | Oct 2018 | 0.627 | Dec 2019 | - | | 0.627 | Continuing | Continuing | Continuing |
| Studies & Design | WR | SSC PAC : Charleston, SC | 0.000 | 0.553 | Oct 2017 | 1.231 | Oct 2018 | 0.348 | Dec 2019 | - | | 0.348 | Continuing | Continuing | Continuing |
| Requirements Analysis | C/CPFF | Classified Contracts : Classified Contracts | 0.000 | 0.616 | Dec 2017 | 1.600 | Dec 2018 | 0.257 | Dec 2019 | - | | 0.257 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | SSC LANT : Charleston, SC | 0.000 | 0.218 | Oct 2017 | 0.539 | Oct 2018 | 1.058 | Dec 2019 | - | | 1.058 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2134 / *Shipboard IW Exploit* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Government Engineering Support | WR | SSC PAC : San Diego, CA | 0.000 | 0.295 | Oct 2017 | 0.460 | Oct 2018 | 0.566 | Dec 2019 | - | | 0.566 | Continuing | Continuing | Continuing |
| Integration, Assembly & Test (PMP Dev) | WR | SSC PAC : San Diego, CA | 4.643 | 1.027 | Oct 2017 | 1.600 | Oct 2018 | 1.632 | Dec 2019 | - | | 1.632 | Continuing | Continuing | Continuing |
| Primary Hardware Development | C/CPFF | Classified Contracts : Classified Contracts | 0.510 | 1.026 | Dec 2017 | 1.598 | Dec 2018 | 1.531 | Dec 2019 | - | | 1.531 | Continuing | Continuing | Continuing |
| Hardware/Software Development | WR | NRL : Washington, DC | 2.810 | 0.435 | Oct 2017 | 0.678 | Oct 2018 | 0.732 | Dec 2019 | - | | 0.732 | Continuing | Continuing | Continuing |
| Software Development | C/CPAF | Classified Contracts : Classified Contracts | 45.584 | 8.926 | Dec 2017 | 12.211 | Dec 2018 | 4.330 | Dec 2019 | - | | 4.330 | Continuing | Continuing | Continuing |
| Software Development | WR | SSC PAC : San Diego, CA | 1.837 | 0.203 | Oct 2017 | 0.316 | Oct 2018 | 0.322 | Dec 2019 | - | | 0.322 | Continuing | Continuing | Continuing |
| Integration, Assembly & Test | C/CPAF | Classified Contracts : Classified Contracts | 3.234 | 0.230 | Dec 2017 | 0.447 | Dec 2018 | 0.456 | Dec 2019 | - | | 0.456 | Continuing | Continuing | Continuing |
| Software Development | WR | SSC LANT : Charleston, SC | 0.293 | 0.023 | Oct 2017 | 0.181 | Oct 2018 | 0.185 | Dec 2019 | - | | 0.185 | Continuing | Continuing | Continuing |
| Integration, Assembly & Test (PMP Dev) | WR | SSC LANT : Charleston, SC | 1.623 | 0.138 | Oct 2017 | 0.861 | Oct 2018 | 0.225 | Dec 2019 | - | | 0.225 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 243.452 | 18.451 | | 32.606 | | 46.256 | | - | | 46.256 | Continuing | Continuing | N/A |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support Prior Years | Various | Various : Various | 17.898 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 17.898 | - |
| Integrated Logistics Support | C/CPFF | Classified Contract : Classified Contract | 1.049 | 0.593 | Dec 2017 | 0.924 | Dec 2018 | 0.942 | Dec 2019 | - | | 0.942 | Continuing | Continuing | Continuing |
| Configuration Management | WR | SSC PAC : San Diego, CA | 1.185 | 0.504 | Oct 2017 | 1.047 | Oct 2018 | 1.068 | Dec 2019 | - | | 1.068 | Continuing | Continuing | Continuing |
| Contractor Engineering Support | C/CPFF | Classified Contract : Classified Contract | 0.000 | 1.093 | Dec 2017 | 2.838 | Dec 2018 | 0.586 | Dec 2019 | - | | 0.586 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2134 / *Shipboard IW Exploit* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Studies & Design | C/CPFF | Classified Contract : Classified Contract | 1.326 | 0.379 | Dec 2017 | 0.738 | Dec 2018 | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 21.458 | 2.569 | | 5.547 | | 2.596 | | - | | 2.596 | Continuing | Continuing | N/A |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test & Evaluation Prior Years | Various | Various : Various | 15.024 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 15.024 | - |
| Developmental Test & Evaluation | WR | SSC PAC : San Diego, CA | 4.329 | 0.550 | Oct 2017 | 0.857 | Oct 2018 | 0.874 | Dec 2019 | - | | 0.874 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | SSC LANT : Charleston, SC | 2.160 | 0.158 | Oct 2017 | 0.329 | Oct 2018 | 0.336 | Dec 2019 | - | | 0.336 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | C/CPFF | Classified Contracts : Classified Contracts | 3.021 | 0.375 | Dec 2017 | 0.779 | Dec 2018 | 0.795 | Dec 2019 | - | | 0.795 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 24.534 | 1.083 | | 1.965 | | 2.005 | | - | | 2.005 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Management Services Prior Years | Various | Various : Various | 31.103 | 0.000 | | 0.000 | | 0.000 | | - | | 0.000 | 0.000 | 31.103 | - |
| Program Management Support | C/CPFF | Classified Contract : Classified Contract | 3.127 | 0.213 | Dec 2017 | 1.107 | Dec 2018 | 1.415 | Dec 2019 | - | | 1.415 | Continuing | Continuing | Continuing |
| Program Management Support | WR | SSC LANT : Charleston, SC | 1.392 | 0.090 | Oct 2017 | 0.618 | Oct 2018 | 0.630 | Oct 2019 | - | | 0.630 | Continuing | Continuing | Continuing |
| Travel | WR | SPAWAR : San Diego, CA | 2.751 | 0.356 | Oct 2017 | 0.555 | Oct 2018 | 0.594 | Oct 2019 | - | | 0.594 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 38.373 | 0.659 | | 2.280 | | 2.639 | | - | | 2.639 | Continuing | Continuing | N/A |

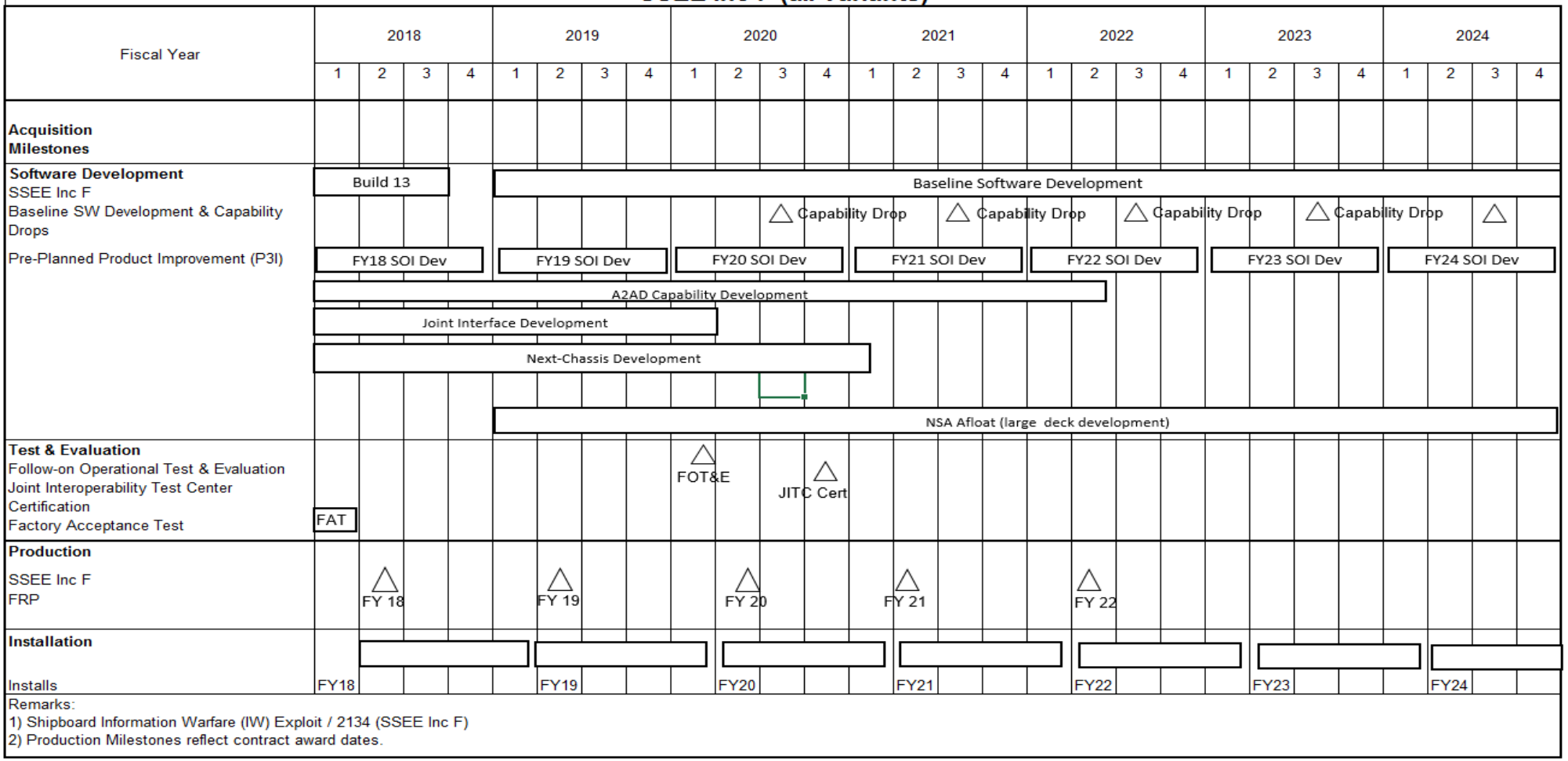
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2134 / *Shipboard IW Exploit* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 327.817 | 22.762 | | 42.398 | | 53.496 | | - | | 53.496 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

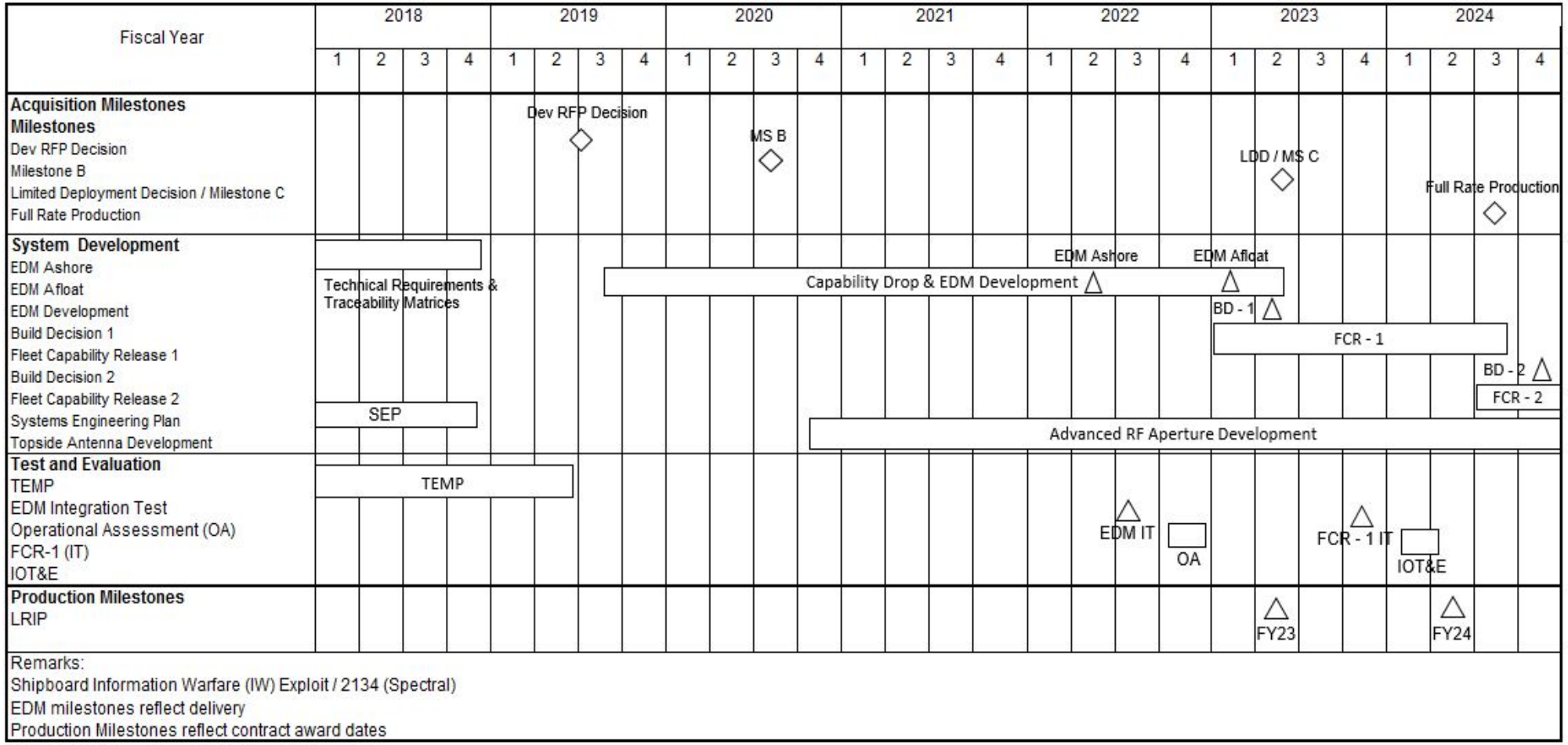
## SSEE Inc F (all variants)




Remarks:
1) Shipboard Information Warfare (IW) Exploit / 2134 (SSEE Inc F)
2) Production Milestones reflect contract award dates.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

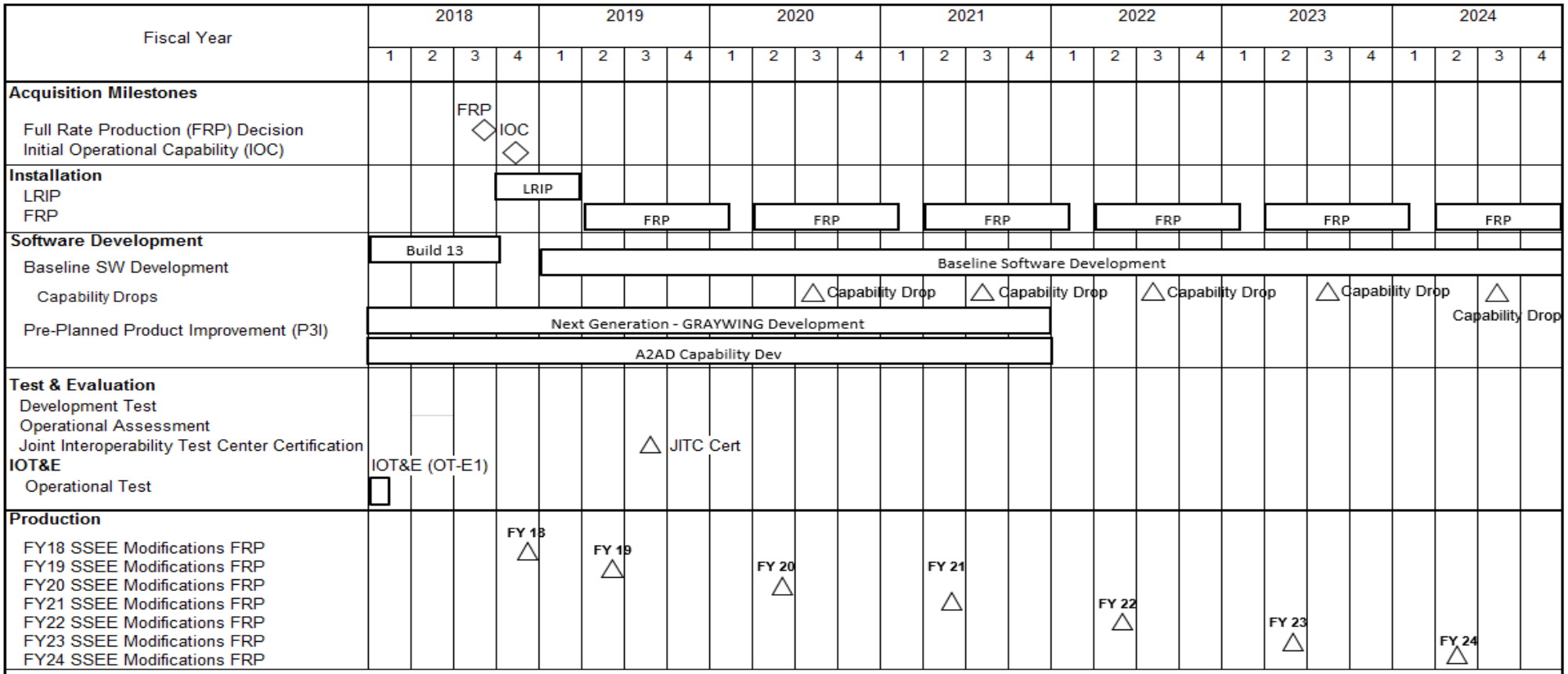
**Spectral**




Remarks:
Shipboard Information Warfare (IW) Exploit / 2134 (Spectral)
EDM milestones reflect delivery
Production Milestones reflect contract award dates

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

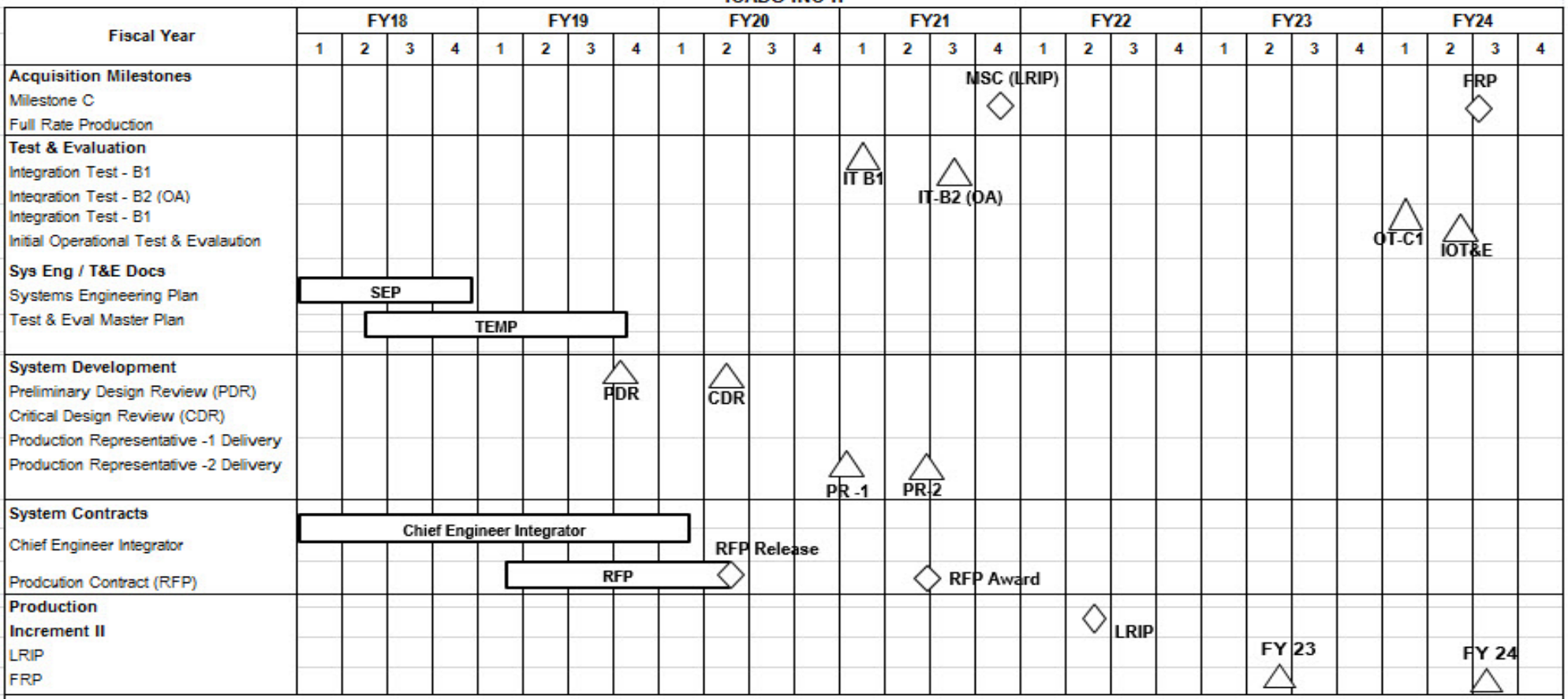
## SSEE Mods




Remarks:
1) Shipboard Information Warfare (IW) Exploit / 2134 (SSEE Mods)
2) Production Milestones reflect contract award dates
3) SSEE MODS Software development integrated and tested inconjunction with SSEE INC F Software builds

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

**ICADS INC II**




**Remarks:**

1) Shipboard Information Warfare (IW) Exploit / 2134 (ICADS Inc II)

2) Production Milestones reflect contract award dates

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***SSEE Inc F*** | | | | |
| Inc F - Joint Integration Test Command (JITC) Certification (FY20) | 4 | 2020 | 4 | 2020 |
| Inc F - Factory Acceptance Test (Inc F Variant) | 1 | 2018 | 1 | 2018 |
| Inc F - Follow On Test and Evaluation (FOT&E) | 1 | 2020 | 1 | 2020 |
| Inc F - FY18 FRP Production Milestone | 2 | 2018 | 2 | 2018 |
| Inc F - FY19 FRP Production Milestone | 2 | 2019 | 2 | 2019 |
| Inc F - FY20 FRP Production Milestone | 2 | 2020 | 2 | 2020 |
| Inc F - FY21 FRP Production Milestone | 2 | 2021 | 2 | 2021 |
| Inc F - FY22 FRP Production Milestone | 2 | 2022 | 2 | 2022 |
| Inc F - Baseline Software Development | 1 | 2018 | 4 | 2024 |
| Inc F - FY18 SOI Development | 1 | 2018 | 4 | 2018 |
| Inc F - FY19 SOI Development | 1 | 2019 | 4 | 2019 |
| Inc F - FY20 SOI Development | 1 | 2020 | 4 | 2020 |
| Inc F - FY21 SOI Development | 1 | 2021 | 4 | 2021 |
| Inc F - FY22 SOI Development | 1 | 2022 | 4 | 2022 |
| Inc F - FY23 SOI Development | 1 | 2023 | 4 | 2023 |
| Inc F - FY24 SOI Development | 1 | 2024 | 4 | 2024 |
| Inc F - A2AD Capability Development | 1 | 2018 | 2 | 2022 |
| Inc F - Joint Interface Development | 1 | 2018 | 1 | 2020 |
| Inc F - Next-Gen Chassis Development | 1 | 2018 | 1 | 2021 |
| Inc F - NSA Afloat (Large Deck Development) | 1 | 2019 | 4 | 2024 |
| Inc F - FRP Installation FY18 | 2 | 2018 | 1 | 2019 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Inc F - FRP Installation FY19 | 2 | 2019 | 1 | 2020 |
| Inc F - FRP Installation FY20 | 2 | 2020 | 1 | 2021 |
| Inc F - FRP Installation FY21 | 2 | 2021 | 1 | 2022 |
| Inc F - FRP Installation FY22 | 2 | 2022 | 1 | 2023 |
| Inc F - FRP Installation FY23 | 2 | 2023 | 1 | 2024 |
| Inc F - FRP Installation FY24 | 2 | 2024 | 4 | 2024 |
| ***Spectral (Increment G)*** | | | | |
| Spectral - Dev RFP Decision | 3 | 2019 | 3 | 2019 |
| Spectral - Milestone B | 3 | 2020 | 3 | 2020 |
| Spectral - Build Decision (BD) 1 | 2 | 2023 | 2 | 2023 |
| Spectral - Build Decision (BD) 2 | 4 | 2024 | 4 | 2024 |
| Spectral - Limitted Deployment Decision (LDD)/ Milestone C | 2 | 2023 | 2 | 2023 |
| Spectral - Full Rate Production | 3 | 2024 | 3 | 2024 |
| Spectral - Engieering Design Models (EDM) Ashore | 2 | 2022 | 2 | 2022 |
| Spectral - EDM Afloat | 1 | 2023 | 1 | 2023 |
| Spectral - EDM Development | 3 | 2019 | 2 | 2023 |
| Spectral - Capability Drop | 3 | 2019 | 2 | 2023 |
| Spectral - Advanced RF Aperture Development | 4 | 2020 | 4 | 2024 |
| Spectral - Fleet Capability Release 1 | 1 | 2023 | 3 | 2024 |
| Spectral - Fleet Capability Release 2 | 3 | 2024 | 4 | 2024 |
| Spectral - Technical Requirements & Traceability Matrices | 1 | 2018 | 4 | 2018 |
| Spectral - Systems Engineering Plan | 1 | 2018 | 4 | 2018 |
| Spectral - Test Evaluation Master Plan (TEMP) | 1 | 2018 | 2 | 2019 |
| Spectral - EDM Integration Test (EDM IT) | 3 | 2022 | 3 | 2022 |
| Spectral - FCR-1 (IT) | 4 | 2023 | 4 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Spectral - Initial Operational Test & Evaluation (IOT&E) | 1 | 2024 | 2 | 2024 |
| Spectral - Operational Assessment (OA) | 4 | 2022 | 4 | 2022 |
| Spectral - Low Rate Initial Production (LRIP) FY23 | 2 | 2023 | 2 | 2023 |
| Spectral - Low Rate Initial Production (LRIP) FY24 | 2 | 2024 | 2 | 2024 |
| ***SSEE Modifications*** | | | | |
| SSEE Modifications - Full Rate Production (FRP) Decision | 3 | 2018 | 3 | 2018 |
| SSEE Modifications - Initial Operational Capability (IOC) | 4 | 2018 | 4 | 2018 |
| SSEE Modifications - LRIP Installation FY18 | 4 | 2018 | 1 | 2019 |
| SSEE Modifications - FRP Installation FY19 | 2 | 2019 | 1 | 2020 |
| SSEE Modifications - FRP Installation FY20 | 2 | 2020 | 1 | 2021 |
| SSEE Modifications - FRP Installation FY21 | 2 | 2021 | 1 | 2022 |
| SSEE Modifications - FRP Installation FY22 | 2 | 2022 | 1 | 2023 |
| SSEE Modifications - FRP Installation FY23 | 2 | 2023 | 1 | 2024 |
| SSEE Modifications - FRP Installation FY24 | 2 | 2024 | 4 | 2024 |
| SSEE Modifications - Build 13 | 1 | 2018 | 4 | 2018 |
| SSEE Modifications - Baseline Software Development | 1 | 2019 | 4 | 2024 |
| SSEE Modifications - FY20 Capability Drop | 3 | 2020 | 3 | 2020 |
| SSEE Modifications - FY21 Capability Drop | 3 | 2021 | 3 | 2021 |
| SSEE Modifications - FY22 Capability Drop | 3 | 2022 | 3 | 2022 |
| SSEE Modifications - FY23 Capability Drop | 3 | 2023 | 3 | 2023 |
| SSEE Modifications - FY24 Capability Drop | 3 | 2024 | 3 | 2024 |
| SSEE Modifications - Next Generation - Graywing Development | 1 | 2018 | 4 | 2021 |
| SSEE Modifications - A2AD Capability Development | 1 | 2018 | 4 | 2021 |
| SSEE Modifications - Joint Interoperability Test Center Certification (JITC Cert) | 3 | 2019 | 3 | 2019 |
| SSEE Modifications - Operational Testing (OT-E1) | 1 | 2018 | 1 | 2018 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| SSEE Modifications - FY18 LRIP Production Modification | 4 | 2018 | 4 | 2018 |
| SSEE Modifications - FY19 FRP Production Modification | 2 | 2019 | 2 | 2019 |
| SSEE Modifications - FY20 FRP Production Modification | 2 | 2020 | 2 | 2020 |
| SSEE Modifications - FY21 FRP Production Modification | 2 | 2021 | 2 | 2021 |
| SSEE Modifications - FY22 FRP Production Modification | 2 | 2022 | 2 | 2022 |
| SSEE Modifications - FY23 FRP Production Modification | 2 | 2023 | 2 | 2023 |
| SSEE Modifications - FY24 FRP Production Modification | 2 | 2024 | 2 | 2024 |
| ***ICADS Inc II*** | | | | |
| ICADS Inc II - Milestone C | 4 | 2021 | 4 | 2021 |
| ICADS Inc II - Full Rate Production (FRP) | 3 | 2024 | 3 | 2024 |
| ICADS Inc II - Integration Test - B1 | 1 | 2021 | 1 | 2021 |
| ICADS Inc II - Integration Test - B2 (OA) | 3 | 2021 | 3 | 2021 |
| ICADS Inc II - Initial Operational Test & Evaluation (IOT&E) | 2 | 2024 | 2 | 2024 |
| ICADS Inc II - Systems Engineering Plan (SEP) | 1 | 2018 | 4 | 2018 |
| ICADS Inc II - Test Evaluation Master Plan (TEMP) | 2 | 2018 | 4 | 2019 |
| ICADS Inc II - OT C1 | 1 | 2024 | 1 | 2024 |
| ICADS Inc II - Preliminary Design Review (PDR) | 4 | 2019 | 4 | 2019 |
| ICADS Inc II - Critical Design Review (CDR) | 2 | 2020 | 2 | 2020 |
| ICADS Inc II - Production Representative Delivery (PR) #1 | 1 | 2021 | 1 | 2021 |
| ICADS Inc II - Production Representative Delivery (PR) #2 | 2 | 2021 | 2 | 2021 |
| ICADS Inc II - Chief Engineer Integration | 1 | 2018 | 1 | 2020 |
| ICADS Inc II - Request for Proposal (RFP) | 1 | 2019 | 2 | 2020 |
| ICADS Inc II - RFP Release | 2 | 2020 | 2 | 2020 |
| ICADS Inc II - RFP Award | 2 | 2021 | 2 | 2021 |
| ICADS Inc II - Low Rate Initial Production (LRIP) | 2 | 2022 | 2 | 2022 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2134 / *Shipboard IW Exploit* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ICADS Inc II - FRP Production Milestone FY23 | 2 | 2023 | 2 | 2023 |
| ICADS Inc II - FRP Production Milestone FY24 | 3 | 2024 | 3 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2174: *Distributed Common Ground System-Navy (DCGS-N)* | 0.000 | 0.000 | 0.000 | 0.583 | - | 0.583 | 0.589 | 0.669 | 0.675 | 0.678 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0304785N (Tactical Cryptologic Systems) from PE 0305208N (Distributed Common Ground Sys) Project 2174 (Distributed Common Ground Systems DCGS-N)) as part of RDTEN PE Consolidation starting in FY 2020. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

**A. Mission Description and Budget Item Justification**

The Distributed Common Ground System - Navy (DCGS-N) is the Navy's portion of the Under Secretary of Defense, Intelligence (USD (I)) DCGS Family of Systems (FoS). The Department of Defense (DoD) has defined a DCGS architecture that will be compatible and interoperable across all of the Services' Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) systems and operations. DCGS accesses and ingests data from space borne, airborne, subsurface, and surface Intelligence, Surveillance, Reconnaissance (ISR) collection assets, intelligence databases and intelligence producers. This collected data is shared across a Joint enterprise using the DCGS Integration Backbone (DIB) and in time, the Defense Intelligence Information Enterprise (DI2E) to enhance access and sharing of ISR information across Joint forces through the use of common enterprise standards and services. DCGS FoS supports Joint Task Force (JTF)-level and below combat operations with critical intelligence for battle management and information dominance across the full spectrum of operations, including peace, conflict, war, and Overseas Contingency Operations (OCO). DCGS is a cooperative effort between the services, agencies, and DoD to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. DCGS-N core components include the analyst workstation from the Global Command and Control System - Maritime (GCCS-M) - Integrated Imagery and Intelligence (I3), Generic Area Limitation Environment (GALE) Signal Intelligence (SIGINT), Common Geo-positioning Services (CGS), Image Product Library (IPL), Modernized Integrated Database (MIDB), Joint Concentrator Architecture (JCA) and Track Management Services (TMS).

The DCGS-N system represents the integration of 1) The processing and exploitation of tactical and Imagery Intelligence (IMINT) and SIGINT; 2) Precision target geopositioning, mensuration, and imagery dissemination capabilities; 3) Selected national IMINT requirements and processing capabilities from the National Geospatial-Intelligence Agency (NGA); and 4) Sharing of Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) and Command and Control information via DIB, DI2E, and Net-Centric Enterprise Services (NCES) standards with a wide range of customers (e.g.,GCCS-M), Joint Mission Planning System (JMPS), and many others). The DCGS-N efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of program insertion.

The DCGS-N Enterprise Node (DEN), which incorporates current DIB standards and DI2E policy, facilitates interoperability and data sharing among the DCGS FoS. DCGS-N ensures compliance with the DoD DCGS network architecture.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* |

The Navy is establishing an ISR Enterprise way ahead that will emphasize a reach back strategy to provide intelligence products to support deployed ship and shore operations. The Navy will also migrate to a Service Oriented Architecture (SOA) that requires the integration and testing of Maritime ISR Enterprise capabilities, migration of ISR SOA applications, integration to leverage a Common Computing Environment (CCE) and the Intelligence Community Information Technology Enterprise (IC ITE). Additionally, DCGS-N will become the focal point for migration of Maritime Domain Awareness (MDA) fusion and analysis Maritime Fusion & Analysis (MFAS) tool applications for the Navy.

Distributed Common Ground System-Navy (DCGS-N) Increment 1 is the Navy's current in service DCGS ISR&T program of record. The system is actively used by Navy force level ships and shore sites in support of the mission. Program is currently performing technical refreshes to Windows 10 per the Department of Defense's initiatives while enabling the long-term transition to DCGS-N INC 2.

Intelligence Carry-On Program (ICOP) is a suite of multi-source intelligence and analytical capabilities which includes an integrated Three-Dimensional (3-D) operational picture displaying intelligence and other data sources to provide a richer and more complete picture of the battle space on unit level platforms. The system supports a full motion video capability that receives, processes, exploits, and disseminates organic and non-organic data as well as the ability to process and correlate Electronic Intelligence (ELINT) and external Communications Intelligence (COMINT Externals). It integrates mature Commercial Off-the-Shelf (COTS) and Government Off-the-Shelf (GOTS) applications with shared storage and communication paths to reach back to the DCGS-N Enterprise Node (DEN), and to provide data sharing to the Maritime Operations Centers (MOC) and national ISR systems, making tactical users a part of the larger ISR enterprise.

In FY 2020, Distributed Common Ground System - Navy (DCGS-N) Increment 1 will continue development, integration and regression testing required to remain aligned with national imagery standards to be incorporated into technology refreshes for Windows 10 (WIN 10)upgrades.

In FY 2020, ICOP will commence integration and testing events in support of F35 Block 3 and Triton. In addition, ICOP will perform interoperability testing with new capabilities such as minotaur and project maven to align with Integrated Fires (IF) / Electromagnetic Warfare (EMW) concepts.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Distributed Common Ground System-Navy (DCGS-N) Increment 1 | 0.000 | 0.000 | 0.133 | 0.000 | 0.133 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 Plans funded under PE 0305208N, Project 2174. | | | | | |
| ***FY 2020 Base Plans:***<br>In FY 2020, DCGS-N Increment 1 will continue development, integration and regression testing that is required to remain aligned with emerging national imagery standards for tech refreshes and End-of-Life Upgrades. | | | | | |
| ***FY 2020 OCO Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019, DCGS-N Increment 1 funding under PE 0305208N, Project 2174 was $0.222M. Funding decreases by $0.089M to $0.133M in FY 2020. The funding decrease from FY 2019 to FY 2020 is attributed to efficiencies, Common Geospatial Services (CGS), and associated systems engineering services. | | | | | |
| ***Title:*** Intelligence Carry-On Program (ICOP)<br>***Articles:***<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>In FY 2020, Intelligence Carry-On Program (ICOP) will commence integration and testing events in support of F35 Block 3 and Triton. In addition, ICOP will perform interoperability testing with new capabilities such as minotaur and project maven to align with Integrated Fires (IF) / Electromagnetic Warfare (EMW) concepts.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019, Intelligence Carry-On Program (ICOP) funding under PE 0305208N, Project 2174 was $0M. Funding increases by $0.450M to $0.450M in FY 2020. The funding increase from FY 2019 to FY 2020 is attributed to ICOP wholeness efforts and will be utilized to commence integration and testing events and to perform interoperability testing of new capabilities. | 0.000<br>- | 0.000<br>- | 0.450<br>- | 0.000<br>- | 0.450<br>- |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 0.583 | 0.000 | 0.583 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2914: *Distributed Common Ground System-Navy (DCGS-N)* | 19.012 | 10.219 | 21.788 | - | 21.788 | 22.422 | 17.307 | 17.565 | 17.953 | 212.550 | 594.942 |
| • RDTEN/0305208N/2174: *Distributed Common Ground System-Navy (DCGS-N)* | 0.325 | 0.222 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 207.388 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

0305208N/2914 is a shared Program Element (PE) with Distributed Common Ground System-Navy (DCGS-N) Increment 1, Increment 2, and Intelligence Carry-On Program (ICOP).

0305208N/2174 funding has been realigned out of PE 0305208N Project 2174 into PE 0304785N project 2174 as part of Program Element Consolidation starting in FY20.

**D. Acquisition Strategy**

DCGS-N Family of Systems (FoS) program utilizes mature Commercial-Off-The-Shelf (COTS) and Governmental-Off-The-Shelf (GOTS) capabilities. The Navy adapts and integrates these capabilities and ensures interoperability with the DCGS Integration Backbone (DIB) standards and Defense Intelligence Information Enterprise (DI2E) policies. Integration of DCGS-N Increment 1 components has transitioned from Government-led to Industry-led based on the award of DCGS-N Increment 1 Prime Mission Product (PMP) contract.

Intelligence Carry-On Program (ICOP) implements a cross-decking methodology that incorporates a two phased delivery, a permanent foundation kit which supports carry-on equipment to include workstation and CM3 antenna / receiver set. This methodology supports speed-to-fleet principles.

**E. Performance Metrics**

DCGS-N Increment 1 Goal: Meet national imagery standards.
DCGS-N Increment 1 Metric: Support development, integration and regression testing required to align with emerging national imagery standards.

ICOP Goal: Support unit-level Intelligence Surveillance Reconnaissance (ISR) processing, exploitation and dissemination for Surface Operations.
ICOP Metric: Rapidly employ new capabilities to deliver to first available afloat platform after receipt of successful test event / report.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering (ICOP) | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.450 | Oct 2019 | - | | 0.450 | Continuing | Continuing | Continuing |
| Integration Assembly & Test | C/CPFF | NSWC China Lake : China Lake, CA | 0.000 | 0.000 | | 0.000 | | 0.120 | Jan 2020 | - | | 0.120 | Continuing | Continuing | Continuing |
| Government Technical Oversight (Dev) | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.013 | Nov 2019 | - | | 0.013 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.583 | | - | | 0.583 | Continuing | Continuing | N/A |

**Remarks**

All Prior Year, FY18 and FY19 cost data is provided under PE 0305208N Project 2174.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 0.583 | | - | | 0.583 | Continuing | Continuing | N/A |

**Remarks**

All Prior Year, FY18 and FY19 cost data is provided under PE 0305208N Project 2174.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* |

## EXHIBIT R4, Schedule Profile

APPROPRIATION/BUDGET ACTIVITY

**RDT&E, N / BA-7**

| Fiscal Year | 2020 | | | | 2021 | | | | 2022 | | | | 2023 | | | | 2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2174 DCGS-N | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **DCGS-N Increment 1 Tech Refresh** | △ FOL/ECP/FC As Req ▽ | | | | △ FOL/ECP/FC As Req ▽ | | | | | | | | | | | | | | | |
| **ICOP Systems Engineering** | △ Engineering and Test Activities ——— | | | | | | | | | | | | | | | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>2174 / *Distributed Common Ground System-Navy (DCGS-N)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2174*** | | | | |
| DCGS-N Increment 1 Tech Refresh | 1 | 2020 | 4 | 2021 |
| ICOP Systems Engineering and Test Activities | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2227: *Distributed Common Ground System (DCGS-N) Inc 2* | 0.000 | 0.000 | 0.000 | 42.745 | - | 42.745 | 37.688 | 36.941 | 34.460 | 35.143 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0304785N (Tactical Cryptologic Systems) from PE 0305208N (Distributed Common Ground Sys) Project 2227 (Distributed Common Ground System (DCGS-N) Inc 2) as part of RDTEN PE Consolidation starting in FY 2020. There are no New Starts associated with this realignment. All budgeted efforts have been previously approved.

Cost-To-Complete reflects Distributed Common Ground System - Navy (DCGS-N) Increment 2 only. DCGS-N Increment 2 reflects Department of Navy Component Cost Position (CCP).

**A. Mission Description and Budget Item Justification**

Distributed Common Ground System-Navy (DCGS-N) Increment 2 addresses a critical shortfall in Tasking, Collection, Processing, Exploitation, and Dissemination (TCPED) capability and capacity to support operational, tactical planning, and execution across the full range of joint military operations. Existing TCPED shortfalls will be exacerbated by planned Navy, Joint, and Allied fielding of new ISR platforms. Currently fielded systems provide localized processing capabilities that will be overwhelmed in future years without a significant change in the way the Navy processes, exploits and disseminates intelligence data. DCGS-N INC 2 will perform technical analyses and engineering efforts associated with implementation of new technology to enable rapid introduction of new products and technology, prevent obsolescence, and end of support issues. DCGS-N Increment 2 will deliver all source fusion and analytical capabilities; provide Maritime Domain Awareness (MDA) capabilities and integrate TCPED capabilities to improve the use and analysis of sensor and platform data. DCGS-N Increment 2 will be based on an enterprise solution to share this information across commands, services, and agencies to promote shared situational awareness. DCGS-N Increment 2 consists of multiple releases. The first release (Fleet Capability Release 1 (FCR-1)) provides an enhanced Navy ISR enterprise that converges and builds on the DCGS-N Increment 1 and MDA Enterprise Nodes; leverages the Defense Intelligence Information Enterprise (DI2E); is compliant with the Common Computing Environment (CCE) and the Community Information Technology Enterprise (IC ITE); federates ISR and TCPED workflow and production improving throughout the automation; exploits new and evolving unmanned systems sensor data; provides Multi-Intelligence (Multi-INT) cross-queuing and modular tools. The second release (Fleet Capability Release 2 (FCR-2)), enhances afloat ISR capabilities by providing a set of software centric tools providing Multi-INT fusion and analysis, behavior prediction and intelligent knowledge management designed to operate in disconnected or denied communications environment. The third release (Fleet Capability Release 3 (FCR-3), enhances embedded training to include new modified capabilities, automatic exploitation of motion imagery, ability to define, detect, and display anomalies, ability to observe entities with target list items, fusion of observation reports to detect non-emitting vessels, enhanced alerting and enterprise connectivity detection. Follow-on releases will be developed in a threat based approach pacing advances in ISR data, analytics, and mission to meet fleet requirements.

In FY 2020, DCGS-N Increment 2 will award a Contract that will support the Government LSI for integration, assembly and test of commercial items, COTS, and GOTS components procured for the DCGS-N Increment 2 baseline. Currently this support is provided on several task orders on several contract vehicles. This contract will

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* |

consolidate that work into a single contract to cover integration of capabilities in FCR-3 through Fleet Capability Release 5 (FCR-5), and ensure Distributed Common Ground System-Navy (DCGS-N) Increment 2 interoperability with the DCGS-N Family of System (FoS), the multi-service and Intelligence Community DCGS FoS, and the Consolidated Afloat Networks and Enterprise Services (CANES) system. DCGS-N Increment 2 will install one (1) unit for Initial Operational Test and Evaluation (IOT&E). DCGS-N Inc 2 will complete integration of Fleet Capability Release 3 (FCR-3) and conduct an In Progress Test Review and Integrated Test of the FCR-3 build including rigorous cyber security testing. DCGS-N Increment 2 will continue to integrate a standard software baseline for the DCGS Family of Systems (FoS). DCGS-N Increment 2 will begin planning for Fleet Capability Release 4 (FCR-4) including developing the Requirements Definition Package (RDP), preparing for the Build Technical Review and Build Decision. DCGS-N Increment 2 will continue Passive Targeting Efforts leveraging Office of Naval Research (ONR) Electromagnetic Battle Management (EMBM) Future Naval Capabilities (FNC) to network and fuse Passive Targeting Data. Intelligence Surveillance and Reconnaissance (ISR) funding supports development and integration efforts to fuse Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) data collected, exploited and disseminated by ISR systems with other intelligence data and automatically provide to shipboard combat systems to support kinetic (bombs, mortars, missiles, bullets) and non-kinetic fires (electronic attack, lasers, cyber-attack) and more effective exploitation of the electromagnetic spectrum. Intelligence, Surveillance, Reconnaissance (ISR) systems will play key roles in enabling the national-to-tactical integration necessary for an integrated maritime targeting capability in support of kinetic and non-kinetic fires.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Distributed Common Ground System-Navy (DCGS-N) Increment 2 | 0.000 | 0.000 | 42.745 | 0.000 | 42.745 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>FY 2019 Plans funded under PE 0305208N, Project 2227. | | | | | |
| ***FY 2020 Base Plans:***<br>In FY 2020, DCGS-N Increment 2 will award a Contract that will support the Government LSI for integration, assembly and test of commercial items, COTS, and GOTS components procured for the DCGS-N Increment 2 baseline. Currently this support is provided on several task orders on several contract vehicles. This contract will consolidate that work into a single contract to cover integration of capabilities in FCR-3 through Fleet Capability Release 5 (FCR-5), and ensure Distributed Common Ground System-Navy (DCGS-N) Increment 2 interoperability with the DCGS-N Family of System (FoS), the multi-service and Intelligence Community DCGS FoS, and the Consolidated Afloat Networks and Enterprise Services (CANES) system. DCGS-N Increment 2 will install one (1) unit for Initial Operational Test and Evaluation (IOT&E). DCGS-N Inc 2 will complete integration of Fleet Capability Release 3 (FCR-3) and conduct an In Progress Test Review and Integrated Test of the FCR-3 build including rigorous cyber security testing. DCGS-N Increment 2 will continue to integrate a standard software baseline for the DCGS Family of Systems (FoS). DCGS-N Increment 2 will begin planning for Fleet Capability Release 4 (FCR-4) including developing the Requirements Definition Package (RDP), preparing for the Build Technical Review and Build Decision. DCGS-N Increment 2 will continue Passive Targeting Efforts leveraging Office of Naval Research (ONR) Electromagnetic Battle Management (EMBM) Future Naval Capabilities (FNC) to network and fuse Passive Targeting Data. Intelligence Surveillance and Reconnaissance | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| (ISR) funding supports development and integration efforts to fuse Intelligence, Surveillance, Reconnaissance and Targeting (ISR&T) data collected, exploited and disseminated by ISR systems with other intelligence data and automatically provide to shipboard combat systems to support kinetic (bombs, mortars, missiles, bullets) and non-kinetic fires (electronic attack, lasers, cyber-attack) and more effective exploitation of the electromagnetic spectrum. Intelligence, Surveillance, Reconnaissance (ISR) systems will play key roles in enabling the national-to-tactical integration necessary for an integrated maritime targeting capability in support of kinetic and non-kinetic fires.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019 funding under PE 0305208N, Project 2227 was $42.624M. Funding increases by $0.121M to $42.745M in FY 2020. The funding increase from FY 2019 to FY 2020 is attributed to support additional security architecture requirements for the integration of kinetic and non-kinetic fires. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 42.745 | 0.000 | 42.745 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/2914: *Distributed Common Ground System-Navy (DCGS-N)* | 19.012 | 10.219 | 21.788 | - | 21.788 | 22.422 | 17.307 | 17.565 | 17.953 | 212.550 | 594.942 |
| • RDTEN/0305208N/2227: *Distributed Common Ground System-Navy (DCGS-N) Inc 2* | 39.825 | 42.624 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 146.802 |

**Remarks**

0305208N/2914 is a shared Program Element (PE) with Distributed Common Ground System-Navy (DCGS-N) Increment 1, Increment 2, and Intelligence Carry-On Program (ICOP).

0305208N/2227 funding has been realigned out of PE 0305208N Project 2227 into PE 0304785N Project 2227 as part of Program Element Consolidation starting in FY20.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* |

**D. Acquisition Strategy**

The Distributed Common Ground System-Navy (DCGS-N) Increment 2 acquisition is based on the Department of Defense Instruction (DODI) 5000.02, Model 3, for incrementally fielded software intensive programs.

**E. Performance Metrics**

DCGS-N Increment 2 Goal: Support afloat forces through a robust enterprise Intelligence Surveillance, Reconnaissance and Targeting (ISR&T) capability, satisfying maritime needs for processing, exploitation and dissemination.

DCGS-N Increment 2 Metric: Will complete integration capabilities Field Fleet Capability Release 3 (FCR-3) and begin integration of capabilities in Fleet Capability Release 4 (FCR-4).

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Integration Assembly & Test | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 19.284 | Oct 2019 | - | | 19.284 | Continuing | Continuing | Continuing |
| Primary Hardware Development | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 2.259 | Oct 2019 | - | | 2.259 | Continuing | Continuing | Continuing |
| Integration Assembly & Test | C/CPFF | Unknown : Unknown | 0.000 | 0.000 | | 0.000 | | 12.120 | Nov 2019 | - | | 12.120 | Continuing | Continuing | Continuing |
| Integration Assembly & Test | C/CPFF | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 1.762 | Oct 2019 | - | | 1.762 | Continuing | Continuing | Continuing |
| Government Technical Oversite (Dev) | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 1.493 | Oct 2019 | - | | 1.493 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 36.918 | | - | | 36.918 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0305208N Project 2227.

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Development Support | C/CPFF | SAIC : Columbia, MD | 0.000 | 0.000 | | 0.000 | | 1.745 | Dec 2019 | - | | 1.745 | Continuing | Continuing | Continuing |
| Development Support | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.171 | Oct 2019 | - | | 0.171 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.053 | Oct 2019 | - | | 0.053 | Continuing | Continuing | Continuing |
| Integrated Logistics Support | C/CPFF | SAIC : Columbia, MD | 0.000 | 0.000 | | 0.000 | | 0.330 | Dec 2019 | - | | 0.330 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.299 | | - | | 2.299 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0305208N Project 2227.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | C/CPFF | SAIC : Columbia, MD | 0.000 | 0.000 | | 0.000 | | 0.265 | Dec 2019 | - | | 0.265 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.451 | Oct 2019 | - | | 0.451 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | C/CPFF | JITC : Fort Meade, MD | 0.000 | 0.000 | | 0.000 | | 0.209 | Oct 2019 | - | | 0.209 | Continuing | Continuing | Continuing |
| Developmental Test & Evaluation | C/CPFF | COTF : Norfolk, VA | 0.000 | 0.000 | | 0.000 | | 0.420 | Nov 2019 | - | | 0.420 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 1.345 | | - | | 1.345 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0305208N Project 2227.

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Travel | Allot | SPAWAR : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.241 | Nov 2019 | - | | 0.241 | Continuing | Continuing | Continuing |
| Government Engineering Support | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.200 | Nov 2019 | - | | 0.200 | Continuing | Continuing | Continuing |
| Program Management Support | C/CPFF | BAH : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 1.159 | Nov 2019 | - | | 1.159 | Continuing | Continuing | Continuing |
| Program Management Support | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.290 | Oct 2019 | - | | 0.290 | 8.165 | 8.455 | - |
| Program Management Support | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.293 | Oct 2019 | - | | 0.293 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 2.183 | | - | | 2.183 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0305208N Project 2227.

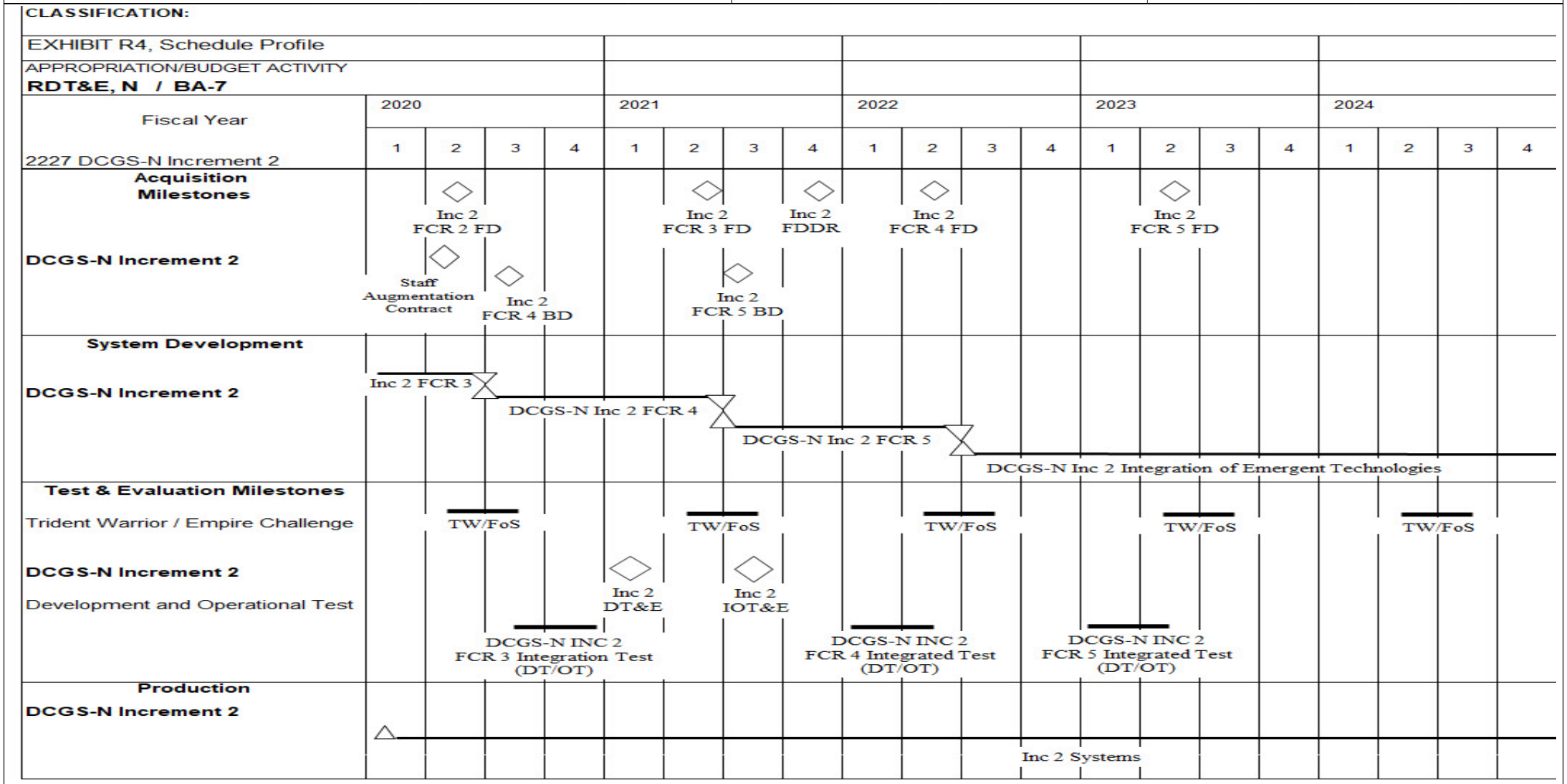
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* | |

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 42.745 | | - | | 42.745 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0305208N Project 2227.

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2227*** | | | | |
| Staff Augmentation Contract | 2 | 2020 | 2 | 2020 |
| DCGS-N Inc 2 FCR-2 Fielding Decision (FD) | 2 | 2020 | 2 | 2020 |
| DCGS-N Inc 2 FCR-4 Build Decision (BD) | 3 | 2020 | 3 | 2020 |
| DCGS-N Inc 2 FCR-3 Fielding Decision (FD) | 2 | 2021 | 2 | 2021 |
| DCGS-N Inc 2 FCR-5 Build Decision (BD) | 3 | 2021 | 3 | 2021 |
| DCGS-N Inc 2 FDDR | 4 | 2021 | 4 | 2021 |
| DCGS-N Inc 2 FCR-4 Fielding Decision (FD) | 2 | 2022 | 2 | 2022 |
| DCGS-N Inc 2 FCR-5 Fielding Decision (FD) | 2 | 2023 | 2 | 2023 |
| DCGS-N Inc 2 FCR-3 Development | 1 | 2020 | 2 | 2020 |
| DCGS-N Inc 2 FCR-4 Development | 2 | 2020 | 2 | 2021 |
| DCGS-N Inc 2 FCR-5 Development | 2 | 2021 | 2 | 2022 |
| DCGS-N Inc 2 Integration of Emergent Technologies | 2 | 2022 | 4 | 2024 |
| Trident Warrior/DCGS Family of Systems (FoS) 2020 | 2 | 2021 | 3 | 2021 |
| DCGS-N Inc 2 FCR-3 Integrated Test (DT/OT) | 3 | 2020 | 4 | 2020 |
| DCGS-N Inc 2 DT&E | 1 | 2021 | 1 | 2021 |
| Trident Warrior/DCGS Family of Systems (FoS) 2021 | 2 | 2021 | 3 | 2021 |
| DCGS-N Inc 2 IOT&E | 3 | 2021 | 3 | 2021 |
| DCGS-N Inc 2 FCR-4 Integrated Test (DT/OT) | 1 | 2022 | 2 | 2022 |
| Trident Warrior/DCGS Family of Systems (FoS) 2022 | 2 | 2022 | 3 | 2022 |
| DCGS-N Inc 2 FCR-5 Integrated Test (DT/OT) | 1 | 2023 | 2 | 2023 |
| Trident Warrior/DCGS Family of Systems (FoS) 2023 | 2 | 2023 | 3 | 2023 |

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>*2227 / Distributed Common Ground System (DCGS-N) Inc 2* |

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| Trident Warrior/DCGS Family of Systems (FoS) 2024 | 2 | 2024 | 3 | 2024 |
| DCGS-N Inc 2 Procurement | 1 | 2020 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3091: *Advanced Cryptological Sys Eng (CCOP)* | 0.000 | 0.000 | 0.000 | 4.515 | - | 4.515 | 4.630 | 4.686 | 4.835 | 4.932 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**Note**

Funding has been realigned into PE 0304785N (Tactical Cryptologic Systems) from PE 0204574N (Advanced Cryptologic Systems Engineering) Project 3091 (Cryptologic Carry On Program (CCOP)) as part of RDTEN PE Consolidation starting in FY 2020. There are no New Starts associated with this realignment. All budgeted efforts have been previous approved.

**A. Mission Description and Budget Item Justification**

The Advanced Cryptologic Systems Engineering - Cryptologic Carry On Program (CCOP) rapidly develops and fields state-of-the-art signal acquisition capabilities in response to Combatant Command requirements for a quick-reaction surface, subsurface and airborne cryptologic carry-on capability. There are approximately 124 cryptologic capable surface ships and shore sites in the current Navy inventory; each is a potential user of this carry-on equipment, depending on deployment schedules and the tempo of operations. In addition, there are other numerous Naval platforms(including U.S. Coast Guard and USNs) that could serve as potential users. This funding line provides resources to enable rapid transition of available Commercial Off-The-Shelf (COTS) and Government Off -The-Shelf (GOTS) technologies that apply to Fleet requirements for carry-on system functionalities. These technologies typically require various levels of integration to leverage on-board systems providing system and mission management, product reporting, and data analysis. COTS / GOTS system documentation and training materials require adaptation or modification to meet fleet operator requirements, or entirely new training materials may need to be developed. Prior to operational deployment, systems must be systematically tested to ensure suitable and reliable operation, tested for network vulnerabilities if connected to shipboard Local Area Networks, and tested relative to interoperability requirements. Certification testing is conducted to meet Office of Naval Intelligence security requirements, and network testing is conducted in accordance with Information Technology (IT) requirements to allow connection to Navy networks. Funding will also provide resources to address rapid deployment of enhancements or improvements to the common hardware and/or software baseline of all other carry-on subsystems to meet emergent requirements. Funding will support development and integration efforts to fuse data produced and distributed by Shipboard IW / Information Operations (IO) systems with other intelligence data at multiple classification levels which is then provided to shipboard combat systems to support kinetic (bombs, mortars, missiles, bullets, etc.) and non-kinetic fires (electronic attack, lasers, cyber) in order to enable a more agile, effective and complete exploitation of the electromagnetic spectrum.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| ***Title:*** Advanced Cryptological Sys Eng - CCOP | 0.000 | 0.000 | 4.515 | 0.000 | 4.515 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| FY 2019 Plans funded under PE 0204574N, Project 3091<br><br>***FY 2020 Base Plans:***<br>In FY 2020, Cryptologic Carry On Program (CCOP) will continue to integrate, test, and document identified COTS and GOTS technologies and subsystems that meet emergent and on-going Fleet requirements as specified in the SOI and target threat list, as well as, continue to develop upgrades to existing systems and subsystems according to Fleet requirements. Funds aid the development of new signal processing algorithms and software based solutions to enable rapid transition of capability to permanently installed SSES systems, including SSEE Family of Systems (FoS) and its variants, the research of self-contained small form factor systems for Patrol craft and other small units, and the research of Adaptive Mission Modules for rapid insertion to counter specific threats or provide intelligence in specific areas of operation. More details are available at higher classification.<br><br>***FY 2020 OCO Plans:***<br>N/A<br><br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>In FY 2019 funding under PE 0204574N, Project 3091 was $4.544M. Funding decreased by $0.029M to $4.515M in FY 2020. the funding decrease from FY 2019 to FY 2020 is due to reducing integration and testing efforts. | | | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 0.000 | 4.515 | 0.000 | 4.515 |

**C. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • OPN/3501: *Cryptologic Communications Equipment* | 26.167 | 19.009 | 13.090 | - | 13.090 | 15.818 | 18.351 | 18.505 | 18.882 | 0.000 | 222.551 |
| • RDTEN/0204574N/3091: *Cryptologic Direct Support* | 2.355 | 4.544 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 29.690 |

**Remarks**

**D. Acquisition Strategy**

Acquisition, management, and contracting strategies support engineering and manufacturing development by providing funds to Space and Naval Warfare Systems Centers Atlantic and Pacific (SPAWARSYSCTR), and miscellaneous contractors with management oversight by SPAWAR.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* |

**E. Performance Metrics**

Cryptologic Carry On Program (CCOP) delivers state-of-the-art signal acquisition software for CCOP systems in response to Combatant Command requirements for a quick-reaction surface, subsurface and airborne cryptologic carry-on capability.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Software Development | C/CPFF | Classified Contract : Classified Contract | 0.000 | 0.000 | | 0.000 | | 2.838 | Jan 2020 | - | | 2.838 | Continuing | Continuing | Continuing |
| Software Development | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.556 | Nov 2019 | - | | 0.556 | 0.000 | 0.556 | - |
| Software Development | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.287 | Nov 2019 | - | | 0.287 | 0.000 | 0.287 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 3.681 | | - | | 3.681 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0204574N Project 3091

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Systems Engineering | C/CPFF | Classified Contract : Classified Contract | 0.000 | 0.000 | | 0.000 | | 0.441 | Jan 2020 | - | | 0.441 | 0.000 | 0.441 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.441 | | - | | 0.441 | 0.000 | 0.441 | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0204574N Project 3091

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Developmental Test & Evaluation | WR | SSC LANT : Charleston, SC | 0.000 | 0.000 | | 0.000 | | 0.182 | Nov 2019 | - | | 0.182 | 0.000 | 0.182 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.182 | | - | | 0.182 | 0.000 | 0.182 | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0204574N Project 3091

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* |

**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Management Support | WR | SSC PAC : San Diego, CA | 0.000 | 0.000 | | 0.000 | | 0.211 | Nov 2019 | - | | 0.211 | 0.000 | 0.211 | - |
| | | **Subtotal** | 0.000 | 0.000 | | 0.000 | | 0.211 | | - | | 0.211 | 0.000 | 0.211 | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0204574N Project 3091

| | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 0.000 | | 4.515 | | - | | 4.515 | Continuing | Continuing | N/A |

**Remarks**

FY18 and FY19 cost data is provided under PE 0204574N Project 3091

| **Exhibit R-4, RDT&E Schedule Profile:** PB 2020 Navy | | **Date:** March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* |

**Exhibit R-4, RDT&E Program Schedule Profile** DATE: Aug 2018

| Appropriation/Budget Activity | Program Element Name and Number | Project Name and Number |
|---|---|---|
| RDT&E,N / BA 05 | 0304785N Cryptologic Direct Support | Advanced Cryptologic Systems Engineering (CCOP) / 3091 |

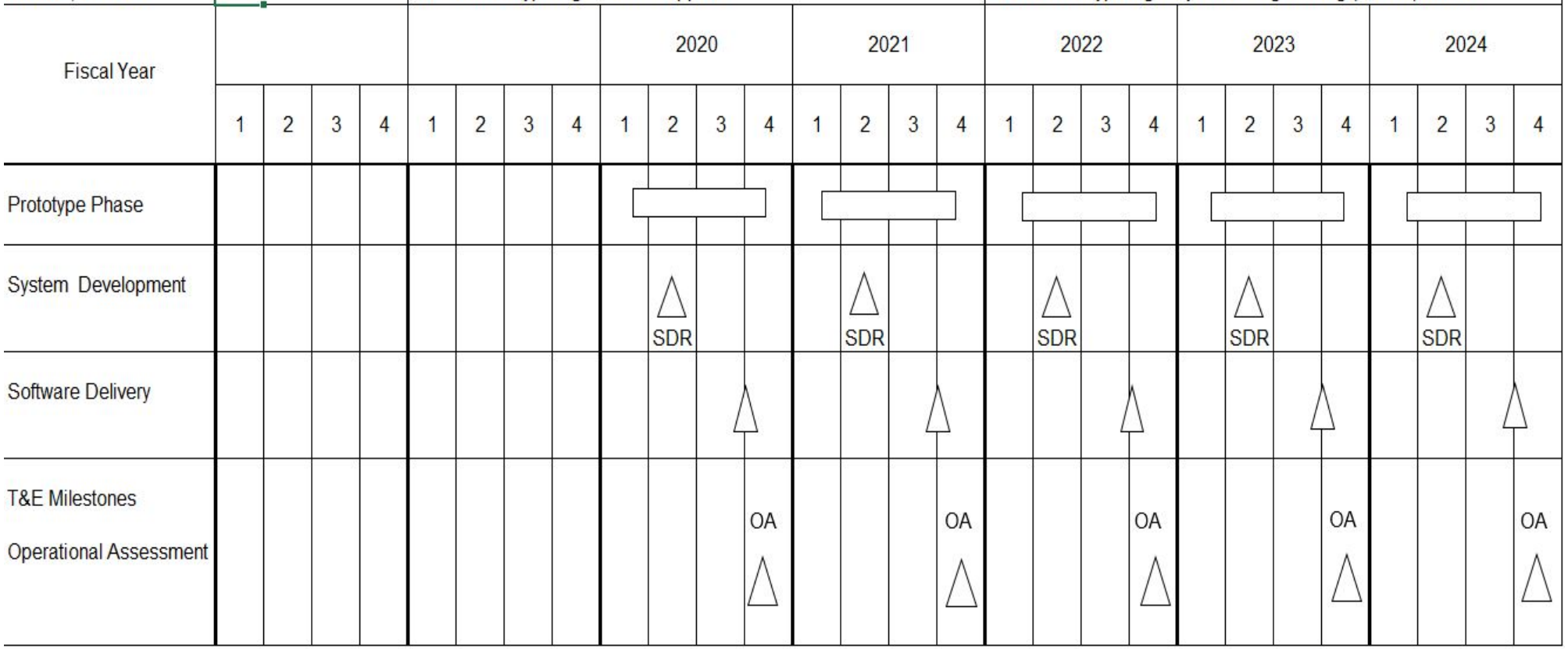



Exhibit R-4, Program Schedule Profile

| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0304785N / *Tactical Cryptologic Systems* | **Project (Number/Name)**<br>3091 / *Advanced Cryptological Sys Eng (CCOP)* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 3091*** | | | | |
| Prototype Phase - 2020 | 1 | 2020 | 4 | 2020 |
| Prototype Phase - 2021 | 1 | 2021 | 4 | 2021 |
| Prototype Phase - 2022 | 1 | 2022 | 4 | 2022 |
| Prototype Phase - 2023 | 1 | 2023 | 4 | 2023 |
| Prototype Phase -2024 | 1 | 2024 | 4 | 2024 |
| System Design Review (SDR) - 2020 | 1 | 2020 | 1 | 2020 |
| System Design Review (SDR) - 2021 | 1 | 2021 | 1 | 2021 |
| System Design Review (SDR) - 2022 | 1 | 2022 | 1 | 2022 |
| System Design Review (SDR) - 2023 | 1 | 2023 | 1 | 2023 |
| System Design Review (SDR) - 2024 | 1 | 2024 | 1 | 2024 |
| Software Delivery - 2020 | 3 | 2020 | 4 | 2020 |
| Software Delivery - 2021 | 3 | 2021 | 4 | 2021 |
| Software Delivery - 2022 | 3 | 2022 | 4 | 2022 |
| Software Delivery - 2023 | 3 | 2023 | 4 | 2023 |
| Software Delivery - 2024 | 3 | 2024 | 4 | 2024 |
| Operational Assessment (OA) - 2020 | 4 | 2020 | 4 | 2020 |
| Operational Assessment (OA) - 2021 | 4 | 2021 | 4 | 2021 |
| Operational Assessment (OA) - 2022 | 4 | 2022 | 4 | 2022 |
| Operational Assessment (OA) - 2023 | 4 | 2023 | 4 | 2023 |
| Operational Assessment (OA) - 2024 | 4 | 2024 | 4 | 2024 |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | Date: March 2019 |
|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | R-1 Program Element (Number/Name)<br>PE 0304785N / *Tactical Cryptologic Systems* | Project (Number/Name)<br>3431 / *Distributed Operations* | |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3431: *Distributed Operations* | 0.000 | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 13.300 | 13.566 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

Funds develop/integrate services into the DO Architecture: mission planning & tasking, maintenance IO, sensor networking, signal acquisition, geolocation, MOPs, remote management, sensor CM, IO support, multi-sensor tasking, and frequency extension while integrating a common operating picture via Integrated Fires and bringing in UAV data (e.g. MQ-4) in both the distributed sensor network and common operating picture giving afloat battle commanders a combined strategic and tactical intelligence information. Program funding commences in 2023.

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0306250M *I (U)Cyber Operations Technology Development* |

| COST ($ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | 0.000 | 2.960 | 6.808 | 26.406 | - | 26.406 | 26.322 | 29.431 | 30.379 | 29.527 | Continuing | Continuing |
| 2958: *Cyberspace Activities* | 0.000 | 2.960 | 6.808 | 26.406 | - | 26.406 | 26.322 | 29.431 | 30.379 | 29.527 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This program element supports cost associated with research, development, and modification of cyber technologies supporting Marine Corps Cyber Mission Forces (CMF) and missions assigned by USCYBERCOM.

The Strategic Cyber Security Operations Development is an initiative to conduct engineering and manufacturing development tasks aimed at the attainment and maintenance of the security properties of the Marine Corps and its assets against relevant security risks within the cyber environment. This project includes cyber security tools system development, integration, enhancement and demonstrations designed at protecting and defending the Marine Corps Enterprise Network (MCEN); defending national interests against cyberattacks of significant consequence; and providing integrated cyber capabilities to support military operations and contingency plans. The project incorporates development of strategic partnerships with defense intelligence agencies and commercial cyber security developers in order to leverage current and emerging cyber security technologies in defensive/offensive tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, and best practices that can be used to protect the Marine Corps' cyber domain; organization and user's assets. Marine Corps' organization and user's assets include connected computing devices, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment.

| B. Program Change Summary ($ in Millions) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 4.502 | 6.808 | 6.910 | - | 6.910 |
| Current President's Budget | 2.960 | 6.808 | 26.406 | - | 26.406 |
| Total Adjustments | -1.542 | 0.000 | 19.496 | - | 19.496 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.117 | 0.000 | | | |
| • Program Adjustments | 0.000 | 0.000 | -0.504 | - | -0.504 |
| • Rate/Misc Adjustments | 0.000 | 0.000 | 20.000 | - | 20.000 |
| • Congressional Directed Reductions Adjustments | -1.425 | - | - | - | - |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy | Date: March 2019 |
|---|---|
| **Appropriation/Budget Activity**<br>1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 0306250M *I (U)Cyber Operations Technology Development* |

**Change Summary Explanation**

The FY2020 funding request was reduced by $0.50M to account for the availability of prior year execution balances.

The FY 2020 funding request was increased by $19.598M. This funding will develop tools, platforms and infrastructure for various Offensive Cyberspace Operations (OCO) requirements to encourage an appropriate Service-Level capability for the Joint Mission Operations Center (JMOC) Meade requirement in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-c) mission.

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | | | | | | | | | | Date: March 2019 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>1319 / 5 | | | | | R-1 Program Element (Number/Name)<br>PE 0306250M / *(U)Cyber Operations Technology Development* | | | | Project (Number/Name)<br>2958 / *Cyberspace Activities* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** | **FY 2021** | **FY 2022** | **FY 2023** | **FY 2024** | **Cost To Complete** | **Total Cost** |
| 2958: *Cyberspace Activities* | 0.000 | 2.960 | 6.808 | 26.406 | - | 26.406 | 26.322 | 29.431 | 30.379 | 29.527 | Continuing | Continuing |
| Quantity of RDT&E Articles | | - | - | - | - | - | - | - | - | - | | |

**A. Mission Description and Budget Item Justification**

This program element supports cost associated with research, development, and modification of cyber technologies supporting Marine Corps Cyber Mission Forces (CMF) and missions assigned by USCYBERCOM.

The Strategic Cyber Security Operations Development is an initiative to conduct engineering and manufacturing development tasks aimed at the attainment and maintenance of the security properties of the Marine Corps and its assets against relevant security risks within the cyber environment. This project includes cyber security tools system development, integration, enhancement and demonstrations designed at protecting and defending the Marine Corps Enterprise Network (MCEN); defending national interests against cyber attacks of significant consequence; and providing integrated cyber capabilities to support military operations and contingency plans. The project incorporates development of strategic partnerships with defense intelligence agencies and commercial cyber security developers in order to leverage current and emerging cyber security technologies in defensive/offensive tools, policies, security concepts, security safeguards, guidelines, risk management approaches, actions, training, and best practices that can be used to protect the Marine Corps' cyber domain; organization and user's assets. Marine Corps' organization and user's assets include connected computing devices, infrastructure, applications, services, telecommunications systems, and the totality of transmitted and/or stored information in the cyber environment.

The FY 2020 funding request was increased by $19.598M. This funding will develop tools, platforms, and infrastructure for various Offensive Cyberspace Operations (OCO) requirements to enable appropriate Service-Level capability for the Joint Mission Operations Center (JMOC) Meade requirement in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-c) mission.

| **B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)** | **FY 2018** | **FY 2019** | **FY 2020 Base** | **FY 2020 OCO** | **FY 2020 Total** |
|---|---|---|---|---|---|
| ***Title:*** Cyber Tool Development | 2.960 | 6.808 | 6.808 | 0.000 | 6.808 |
| ***Articles:*** | - | - | - | - | - |
| ***FY 2019 Plans:***<br>Continued the cyber tool development process for MARFORCYBERCOM. The task requires complex and experienced skill sets in order to write code and perform: technology research, software and engineering development, integration of systems concepts, prevention of adversary presence, product development. The increase of $3.848M from FY18 to FY19 is to provide the full requirement of tool, platform and infrastructure development capability. | | | | | |
| ***FY 2020 Base Plans:*** | | | | | |

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0306250M / *(U)Cyber Operations Technology Development* | **Project (Number/Name)**<br>2958 / *Cyberspace Activities* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|---|---|---|---|---|
| Continue the cyber tool development process for MARFORCYBERCOM. The task requires complex and experienced skill sets in order to write code and perform: technology research, software and engineering development, integration of systems concepts, prevention of adversary presence, product development.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>There was no increase/decrease from FY19 to FY20. | | | | | |
| ***Title:*** Common Access Platform<br>***Articles:***<br>***FY 2019 Plans:***<br>N/A<br>***FY 2020 Base Plans:***<br>Starting in Fiscal Year 2020, MARFORCYBER was directed to man, train and equip a Joint Mission Operation Center (JMOC) at Fort Meade. This is one of four JMOCs in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-C) mission. The FY 2020 funding request was increased by $19.598M. This funding will develop tools, platforms and infrastructure for various Offensive Cyberspace Operations (OCO) requirements to encourage an appropriate Service-Level capability for the Joint Mission Operations Center (JMOC) Meade requirement in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-c) mission.<br>***FY 2020 OCO Plans:***<br>N/A<br>***FY 2019 to FY 2020 Increase/Decrease Statement:***<br>The FY 2020 funding request was increased by $19.598M. This funding will develop tools, platforms and infrastructure for various Offensive Cyberspace Operations (OCO) requirements to encourage an appropriate Service-Level capability for the Joint Mission Operations Center (JMOC) Meade requirement in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-c) mission. | 0.000<br>- | 0.000<br>- | 19.598<br>- | 0.000<br>- | 19.598<br>- |
| **Accomplishments/Planned Programs Subtotals** | 2.960 | 6.808 | 26.406 | 0.000 | 26.406 |

**C. Other Program Funding Summary ($ in Millions)**

N/A

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0306250M / *(U)Cyber Operations Technology Development* | **Project (Number/Name)**<br>2958 / *Cyberspace Activities* |

**C. Other Program Funding Summary ($ in Millions)**

**Remarks**

**D. Acquisition Strategy**

The funding will be used for contracted tool developers located at Fort Meade, Maryland and through the establishment of a contract with SPAWAR PACIFIC for the preponderance of the work. However,other vendors or government activities that are yet to be determined will be used in further infrastructure development for the cyber environment. Per This funding will develop tools, platforms and infrastructure for various Offensive Cyberspace Operations (OCO) requirements to encourage an appropriate Service-Level capability for the Joint Mission Operations Center (JMOC) Meade requirement in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-c) mission.

**E. Performance Metrics**

Program/Technical reviews

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0306250M / *(U)Cyber Operations Technology Development* | **Project (Number/Name)**<br>2958 / *Cyberspace Activities* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2018 Cost | FY 2018 Award Date | FY 2019 Cost | FY 2019 Award Date | FY 2020 Base Cost | FY 2020 Base Award Date | FY 2020 OCO Cost | FY 2020 OCO Award Date | FY 2020 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool Development | Various | Various : Various | 0.000 | 2.960 | Oct 2017 | 6.808 | Dec 2018 | 6.808 | Sep 2020 | - | | 6.808 | Continuing | Continuing | Continuing |
| Common Access Platform | Various | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 19.598 | Sep 2020 | - | | 19.598 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 2.960 | | 6.808 | | 26.406 | | - | | 26.406 | Continuing | Continuing | N/A |

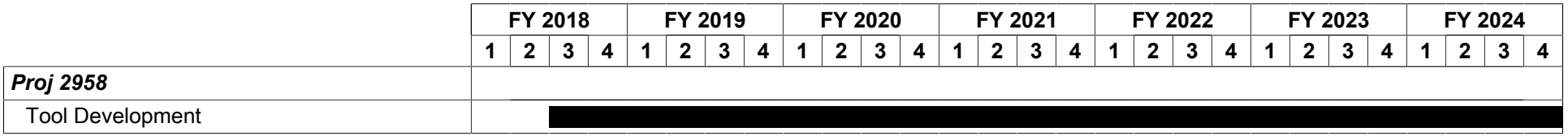
**Remarks**

MARFORCYBER will continue previous efforts such as providing tool developers, supporting other environment development efforts, and developing software capabilities to enable the completion of offensive and defensive cyberspace operations mission requirements and protect the Marine Corps cyber domain and infrastructure. The FY 2020 funding request was increased by $19.598M per PDM20 700A1 as directed by United States Cyberspace Command (USCC). This funding will develop tools, platforms, and infrastructure for various Offensive Cyberspace Operations (OCO) requirements to enable an appropriate Service-Level capability for the Joint Mission Operations Center (JMOC) Meade requirement in support of United States Cyberspace Command (USCC) and Joint Forces Headquarters Cyber (JFHQ-c) mission.

| | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 2.960 | | 6.808 | | 26.406 | | - | | 26.406 | Continuing | Continuing | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0306250M / *(U)Cyber Operations Technology Development* | **Project (Number/Name)**<br>2958 / *Cyberspace Activities* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy | | Date: March 2019 |
|---|---|---|
| **Appropriation/Budget Activity**<br>1319 / 5 | **R-1 Program Element (Number/Name)**<br>PE 0306250M / *(U)Cyber Operations Technology Development* | **Project (Number/Name)**<br>2958 / *Cyberspace Activities* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Proj 2958*** | | | | |
| Tool Development | 3 | 2018 | 4 | 2024 |